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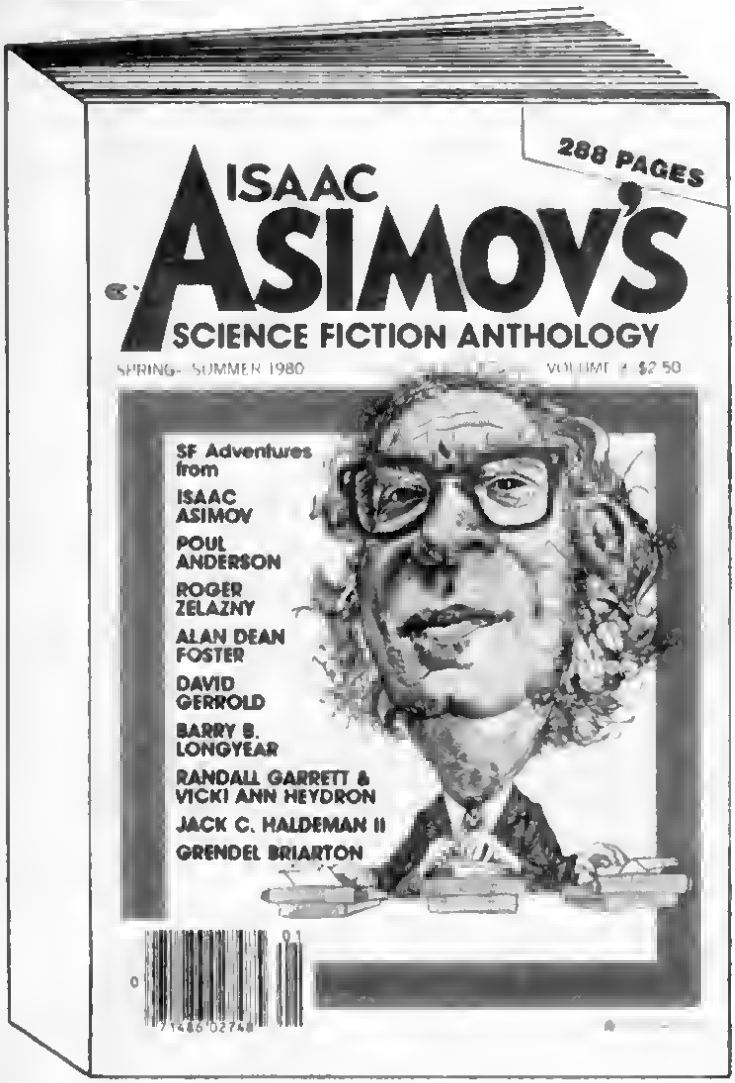

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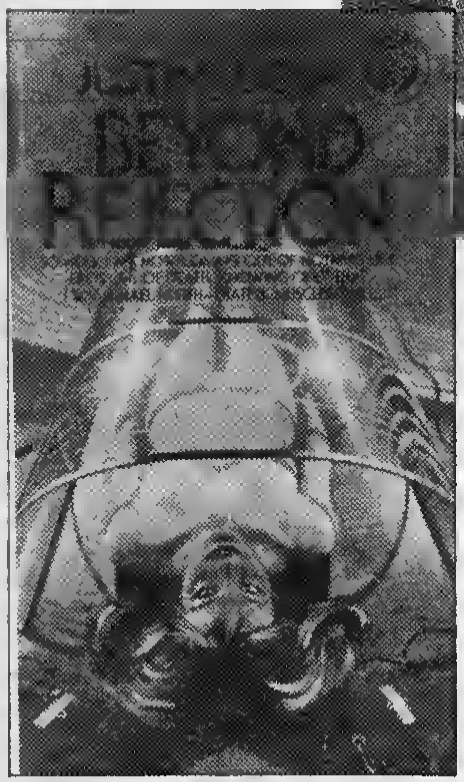

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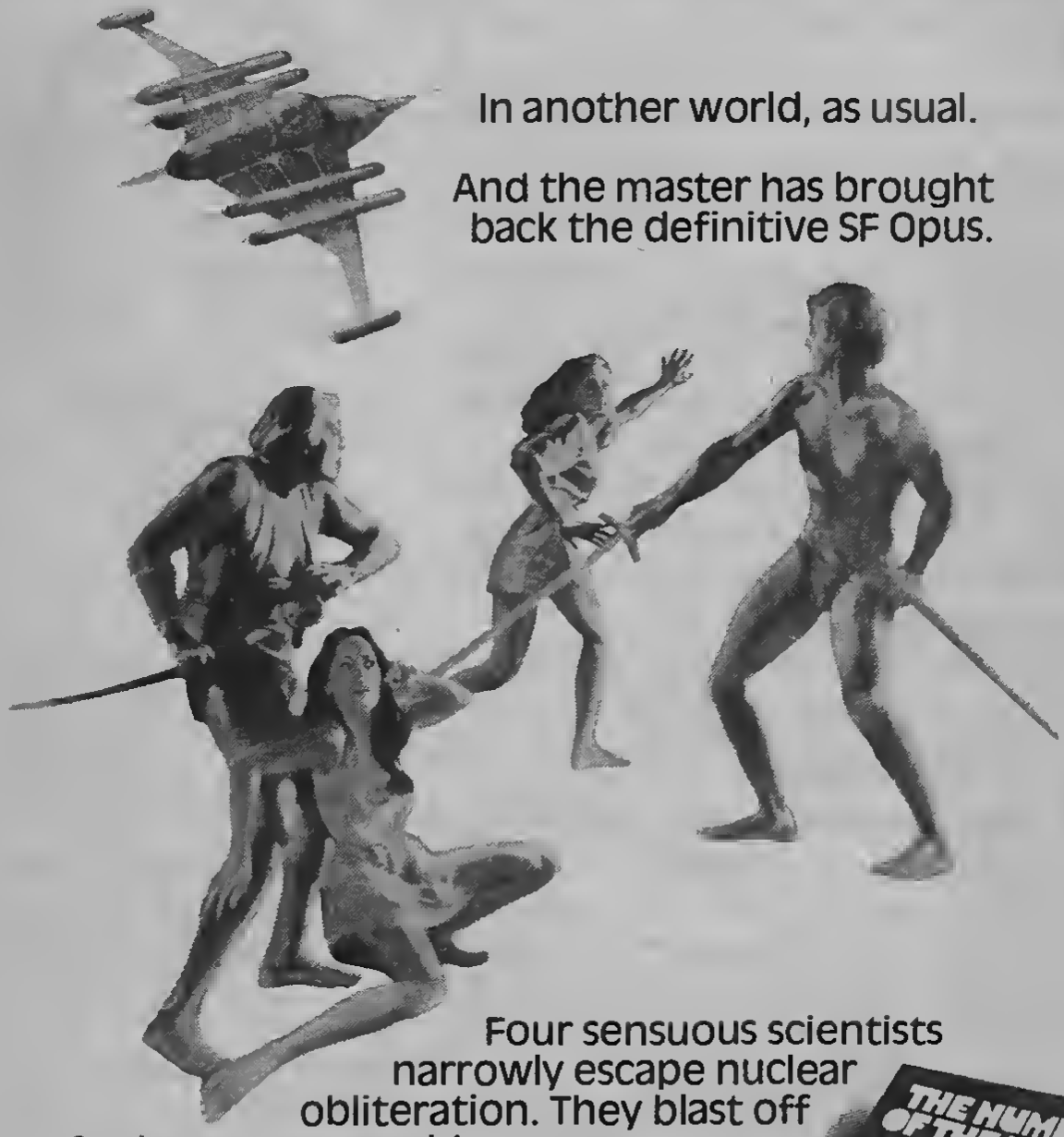

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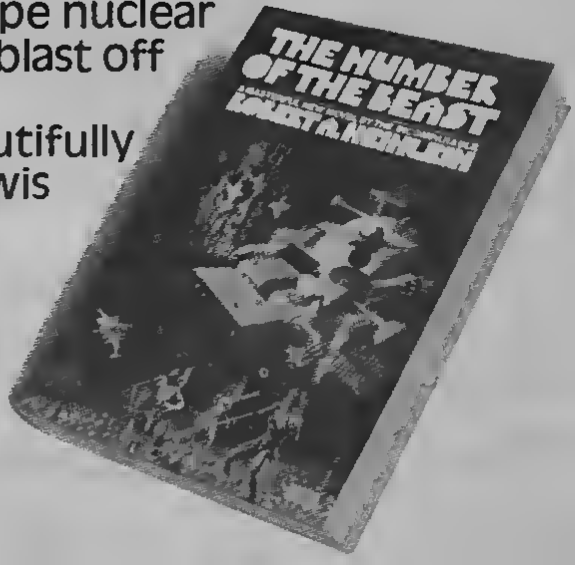

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EDITORIAL: FAMILY MATTERS

by Isaac Asimov

art: Frank Kelly Freas

Sometimes I wonder how I would have felt, when I was 18 and trying to sell a science fiction story for the first time, if I could somehow have foreseen that the day would come when I would have my "own" magazine, with my name in the title.

I wouldn't have believed it, of course. In my most megalomaniac moments, I couldn't have pictured such a thing. Yet here it is, and though it may seem like a dream of Paradise, it has its problems.

Among the problems is my wife, Janet Jeppson. —No, it's not the problem you might think. She's a sweetheart and I'm deeply in love with her.

You see, she's a science fiction fan and has been one for years. That's not surprising, as I probably wouldn't have met her in the first place if she weren't. We first met at a science fiction convention (as you will see if you read the second volume of my autobiography—*In Joy Still Felt*—published by Doubleday in April, 1980).

Like many science fiction fans, Janet has been trying to write science fiction. She has had the ambition to write since grade school and, I suspect, would by now have succeeded in that ambition and have become an established writer, had she not allowed herself to be diverted into medical school and all that followed.

She is, by profession, a physician, a psychiatrist, a psychoanalyst, and—on top of that—Director of Training at the William Alanson White Institute of Psychiatry, Psychoanalysis, and Psychology in New York City.

All that didn't leave her with much spare time for stroking the typewriter.

What spare time she had, however, she used in that direction. By the time I met her she had various novels, short stories, and essays written. Of these, she had sold a mystery story and had nearly sold a few other items.

Getting to know me served as an encouragement for her to con-

tinue to write, for anyone watching me gets the idea that writing is easy. (And so it is, if you have the talent and temperament for it to begin with, and then go on to accumulate several decades of unremitting hard work and experience.)

She worked furiously at a science fiction novel, therefore, writing in her spare time, revising, tearing up and starting over, and going through all the agonies inseparable from the task. Occasionally, she would ask me to look at the manuscript and give her some sage advice.

Steadfastly, I refused. She was not pleased with the refusal, and it produced the only appreciable strain in our relationship over the years. But I held fast to my position, which was that if I as much as looked at the manuscript and changed a single word, she would, if she ever sold the story, always feel that it was my changed word that had done it.

"You must stand on your own feet, Janet," I said. "If the novel is sold, you must be certain that I had nothing to do with it and that you did it all."

She found it difficult to accept that, but she came to realize the validity of that point of view.

When the time came for submitting the novel, knowing me finally helped. Various editors knew her because they knew me and that meant that in some cases (not in all) they gave it a fast reading instead of making her wait months.

In some cases that just meant a fast rejection. Ben Bova, one of our very best friends, read the manuscript with a view to possible serialization in *Analog* and rejected it, albeit with kind words. But then he has, in his time, rejected stories of mine, too. That sort of thing makes us feel sad and disappointed, but it doesn't affect friendship and shouldn't.

Eventually, Houghton Mifflin considered the novel and thought it might have possibilities. The editor, Austin Olney, asked for extensive revisions, which were made. On November 30, 1973, he called to say that he was taking the novel. As it happened, that day was the day Janet and I were married, and the call came just as the ceremony was completed.

The novel, "The Second Experiment," was published in 1974 under the byline J.O. Jeppson. Janet avoided the use of "Asimov" (to which she was legally entitled) and expressly forbade Houghton Mifflin to mention the relationship to me in the flap matter or the advertising.

The book did reasonably well for a first novel and was reasonably

well-reviewed. It earned back its advance on trade sales and went into paperback editions in the United States, Great Britain, and France.

Yet the inevitable happened. A reviewer in a science-fiction fan magazine, having disapproved of the book thoroughly, went on to state that only nepotism could explain its publication.

Too bad. I had strained my relationship with Janet and we had hampered the Houghton Mifflin publicity department in order to remove the faintest suspicions of nepotism, and it hadn't helped.

Since then, Janet has written a mystery novel—which never sold—and another science fiction novel which, after revision, was sold to Houghton Mifflin and which appeared in the spring of 1980 as *The Last Immortal,* again by J.O. Jeppson. Again, I had refused to read the manuscript or to aid her in any way, however indirect.

Aside from her novels, Janet has in recent years sold a short story to *F & SF*, and a couple of non-fiction pieces as well. One of the latter was an article that appeared in the *New York Times* travel section in January 1979; and that received a great deal of favorable attention. In none of these cases did I lift a finger to help her.

Well, then, some months ago, I came across the manuscript of a short story on her desk entitled "The Cleanest Block in Town." Intrigued by the title, I asked permission to read it. I did, and was fascinated.

So, for the first time since I had met her, I suggested a collaboration. I wanted to rewrite the story, make it longer, add one or two of my own ideas, and then offer it to the world. Janet agreed; and, eventually, we had a story that bore the byline of "J. O. Jeppson and Isaac Asimov."

The next step was to decide where to send it. It seemed to me that it *had* to go to *Isaac Asimov's Science Fiction Magazine.* After all, I am *supposed* to write for it occasionally. In fact, any time I write a science fiction story, *IA'sfm* must, by contract, see it first unless I get special permission to submit it elsewhere. Besides, I liked the story and thought it would look good in the magazine.

So we sent it to George Scithers—and he *rejected* it.

That's all right. He's supposed to do that if he doesn't like a story. And, as I explained in an earlier editorial (see the December 1979 issue) he has the last word even if I openly disagree with him. Even if it's my own story that's in question, he still has the last word. So that was that.

Janet and I didn't exactly feel good about it. I myself felt particularly bad since I couldn't help but wonder if I had perhaps spoiled

the story, and if she might not have had better luck sending it out in her own version. Just the same, we were both of us professional enough to accept the rejection.

After that, Janet wrote another short story and this time didn't welcome any interference from me. She sent it to George and, after asking for some small revisions, he agreed to take it. (This reinforces my feeling that she's better off on her own than with my help.)

In this issue, then, Janet's story will appear under the byline of J. O. Jeppson, and we're making no secret of her identity. She's Mrs. Isaac Asimov.

However, her appearance in "my" magazine is, I hope you all see, *not* a matter of nepotism, since George has already shown that he is quite capable of rejecting her stories (and mine, too, for that matter) if he feels he should.

To summarize, being married to me has done Janet no good whatever in her longed-for writing career, but has, instead, set up considerable disadvantages in the way of psychological road-block. Not the least of these disadvantages is her awareness of the impossibility of avoiding the unfair (and sometimes spiteful) suspicion that I've helped her, or used my "influence" to get her published.

But she loves me anyway, and I love her.

Please **do not** send us your manuscript until you've gotten a copy of our discussion of manuscript format and story needs. To obtain these, send us a self-addressed, stamped business-size envelope (what stationery stores call a number 10 envelope), and a note requesting this information. The address for this and for all editorial correspondence is Box 13116, Philadelphia, PA 19101. While we're always looking for new writers, please, in the interest of time-saving, find out what we're looking for, and how to prepare it, before submitting your story.

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ON BOOKS
by Baird Searles

Songmaster by Orson Scott Card, The Dial Press, $10.95.
The Sword and the Satchel by Elizabeth Boyer, Del Rey, $2.25 (paper).
The House Between the Worlds by Marion Zimmer Bradley, Doubleday, $10.00.
Dragon's Egg by Dr. Robert L. Forward, Del Rey, $9.95.
The Incredible Umbrella by Marvin Kaye, Dell, $1.95, (paper).
The Brodart and Jostens Library Products Catalog (without charge on request to Brodart, 1609 Memorial Ave. Williamsport, PA 17705).

I am one of those slow-moving, slow-reacting people who don't like surprises; the surest way to unnerve me for weeks is to give me a surprise party, and I've even been known to be fretful about opening presents—sometimes one's friends do have the oddest ideas of what one wants. One of the few places this surprise phobia doesn't operate is in my reading and viewing. Having been into science fiction for thirty-five years, I still retain my pleasure in it, but there are few surprises left on the printed page or the screen, and as I've indicated before in this column, I take great pleasure in the book or film that *can* surprise me.

And therefore I took great pleasure in Orson Scott Card's *Songmaster*. This novel kept surprising me; and the only disadvantage to this, as I've also noted before, is that it presents a problem to the conscientious critic. How much can he say about the book without dulling the edges of the fun of discovery for the reader?

One thing I guess I can safely report is that it didn't turn out to be the book I thought it was going to be when I started it. A major trend of the decade in science fiction has been toward a conceptual bias, the edges of which are a little hard to define, but which I think of as social-anthropological or "soft" SF, as opposed to hard-core or high-tech science fiction. This current trend certainly owes its beginnings to Le Guin's *The Left Hand of Darkness* and Dickson's "Dorsai" books in one way or another; in it, we have been getting meticulously built cultures (future and/or alien) with the characters and plots (if any) growing out of these cultures. It's all very intelligent and humanistic; and just lately, I've found myself wishing that a character in one of these well-thought-out books would pull

out a ray gun and zap somebody; i.e. recent examples have tended toward the boring.

When I started *Songmaster,* I thought, "Oh, oh; here we go." The Songhouse on Tew educates singers and sends them out into the Galaxy. However, the songs of the Songhouse are not just singing as we know it; they are a method of communication, of manipulation even, for the lore of the Songhouse has enhanced the power of music to a point never before reached.

The epitome of the Songhouse graduates are the "Songbirds," who are trained from their childhood to just prior to adolescence (which is chemically delayed) to vocalize for one person only; they therefore cost a king's ransom to "hire" (it's really a sort of peonage). But there are enough in a vast and varied galaxy that can afford a king's ransom, and the Songhouse takes care of its own, so no one suffers.

That's a simplified background to a very complex milieu. (Did it ever occur to you that a science fiction reviewer has to do justice in a paragraph to a created world that a writer has taken hundreds of pages to describe, while a mainstream reviewer can get away with "The novel takes place in San Francisco, which the author captures brilliantly"?)

My first impression was that this was going to be a sort of intellectualized "little Songbird that could," and the first few chapters tended to confirm this, since we do meet the most prodigious of all potential Songbirds and follow his training for the most gilded cage of all, that of the ruler of the Galaxy.

But then things take off—and they really take off. More than a few people get zapped along the way, and there's intrigue, action, kidnappings, love, hate—and surprises. And more than that I will not say about the plot; discover it for yourself.

I will add a couple of thoughts, however. One is, in a way, negative, or let's say dubious. The power in *Songmaster* is based on music—essentially an extension of what music is as we know it. Now in hard core SF—the nutz-'n'-bolts kind—we find it relatively easy to accept the extension of technology as we know it, aided, of course, by the expertise of the writer. We have also accepted the extension of human abilities, but usually in very speculative areas such as telepathy. Here we are asked to accept on faith a kind of superlative quality in something that is very much a part of our lives. Music—man-made music—music from the human throat. All I can say is that it worked for me.

(On the other hand, it's that very quality that made me think, "They'll never make a movie out of this one." Special effects de-

partments can simulate space flight and other arcane conceptions, but they'll not duplicate the music of the Songbirds. Not an important point, necessarily, but it's nice to know that there are still things that literature can do that is possible in no other medium. Books forever!)

As a final grace note, let me add that Card in *Songmaster* has captured, with all the action and emotion, a quality that many recent writers seem to have strived for and few achieved: a mythic quality, a feeling of legend that is extraordinarily touching. Quite an accomplishment.

The Sword and the Satchel, by Elizabeth Boyer, not only has the silliest title of the year but is another one of those *Lord of the Rings* clones. This one, though, is so unpretentious and galumphs along so cheerfully on the quest to conquer the dark wizard Surt with the elven sword Kildurin that I can't really be mad at it.

As usual, there is an unpleasant race (trolls, in this case), wizards good and bad, elves (also good and bad), and a hero. The hero in this case is named Kilgore; he is very immature, by turns sulky and cocky; and I didn't like him much.

What originality there is is due to the use of Norse mythology as a background. Surt, for instance, is trying to bring on the Fimbul Winter; there is a repeat of the famous contest against fire, age, and the Midgard Serpent; and the elves are referred to alternately as the Alfar.

If you're absolutely desperate for a fix of heroic fantasy, *The Sword and the Satchel* might do it. At least it won't result in a severe case of nausea, as with certain others I might name.

The Alfar also turn up, curiously enough, in Marion Zimmer Bradley's *The House Between the Worlds*. (I had run into that strain of elvenkind before only in Alan Garner's *The Weirdstone of Brisingamen*.) She credits Poul Anderson with introducing her to them in her gracious dedication to that writer.

Ms. Bradley's Darkover series is possibly the hottest science fiction series going at the moment; it is so popular, in fact, that I have been a little worried that it is turning into a sort of fadcult, and there's too much good in the series for that to happen.

Therefore, I was doubly pleased that this new, non-Darkover novel is absolutely enthralling (in both senses—of magic and of excitement).

It concerns a young parapsychologist who, in experimenting with

a drug that seems to enhance ESP powers, finds himself thrust into several new worlds, in particular that of the Alfar, who are the basis of the legends of elves (there are gateways between the worlds which are open periodically).

Bradley's specialty has always been a seamless conjunction of SF and fantasy, and here it is superbly done. The other worlds are totally convincing without lacking glamour (again, in the magic sense); and her ultrarealistic, mundane background of the Berkeley campus is rife with students playing at Dungeons and Dragons and Creative Anachronism, a fascinating contrast to the "real" fantasy taking place there.

Readers versed in the past of the genre will know I can have no higher praise than to compare *The House Between the Worlds* to the science fantasies of Henry Kuttner (*The Dark World, The Mask of Circe*); it rivals them in its wonderful concepts and its pell-mell action, with the hero falling in and out of various worlds at the most hair-raising moments.

To move from the far left (or sinister) side of the SF spectrum, that closest to fantasy, to the far right (or dexterous) side, that of high-tech writing, there is an intriguing new hard science novel from Dr. Robert L. Forward, *Dragon's Egg*. Clarke and Asimov aficionados will certainly enjoy it; I see it in the direct line of Hal Clement's work, since it is a tour-de-force meticulous creation of an unbelievably alien race, in this case the inhabitants of a neutron star, with a surface gravity of 67 billion gees and a temperature of 8200 degrees! These creatures have unspeakable sexual habits, are cannibals, and the mind retreats from what they look like. Nevertheless, Forward makes them comprehensible, if not "human."

But the most extraordinary factor here is that they live at a speed about a million times faster than we do; therefore, the single month of time in which the majority of the action of the novel takes place covers the entire history of the race from the invention of numbers (which is wonderfully worked out and reported) to FTL travel. On the human side (there are terrestrials in the book), this barely covers the time spent by a scientific research team in getting to the neutron star and running a few tests. The major point of the book is the effect (until quite late in the book, the *unknowing* effect) of the humans on the development of the aliens, and the staggering attempts at communication by the two races under these incredible conditions.

My only criticism of *Dragon's Egg* is a fair amount of awkwardness

in the writing. The esthetic snobs will say, "What do you expect from high-tech writers?" But so far as I'm concerned, there is an enormous skill needed in writing fiction about highly technical concepts, and that skill has been demonstrated by writers such as Asimov and Clarke. They are often accused of being style-*less*; but getting across what they do get across in acceptable, if not graceful, prose is one of the major achievements of SF. That Dr. Forward has not reached that plateau in his first novel is not surprising.

And finally for mention of current books, is another fantasy, this one called *The Incredible Umbrella* by Marvin Kaye, one of the co-authors of that interesting post-holocaust novel, *The Masters of Solitude*. The new work is about as far from that near-epic as possible; it's about an enchanted bumbershoot that zaps its owner into various literary universes. The immediate analogue (disregarding a recent novel by Heinlein) is de Camp and Pratt's "Harold Shea" stories. But there the universes were broad-scaled, based on either various mythologies or works as wide-ranging as *The Faerie Queene*. Kaye, in *The Incredible Umbrella*, has based his worlds on smaller fictional works—*Dracula*, the Sherlock Holmes series, Gilbert and Sullivan operettas—and there's a feeling of constriction, which he has tried to obviate by cross-connecting them. But I'm afraid that one must be a G&S or Holmes buff to really appeciate the humor of the situations.

Now and again, I would like to devote part of this column to collecting. Science fiction and fantasy people seem to be collectors almost by definition; I, myself, am a collector on a modest scale and therefore know how difficult it is for the person who is just beginning, or who lives somewhere where there are no specialty shops, to get information.

For instance, let me share a recent discovery of mine, the Brodart and Jostens Catalog of library supplies.

This is a huge (224 pages) and exhaustive collection of everything the book collector could want, from preservative covers for paperbacks to bind-it-yourself systems of terrifying complexity. For me, the most delectable items were book jackets for hard-covers and paperbacks, in infinite variety. The types I finally settled on and found to be completely satisfactory were:

For hard-covers, what are called "fold-on book jacket covers." As implied, these cover the dust jacket *by folding*; in other words, there is nothing permanently attached to binding or wrapper. They pro-

vide a handsome and waterproof covering which prevents the dust jacket from tearing or soiling; they come in a vast array of heights which is really unnecessary since they fold to size. (I found the 9" and the 11" most useful).

For paperbacks, there are the "crystal shield book savers." These are hard to describe. They are a heavy-gauge transparent polyester, and therefore must be ordered exactly to height since they do not fold down. By an ingenious self-stick feature, they also fit exactly across the width of the book, right-side front cover to left-side back cover, no matter how thick the spine, and again, with nothing permanently adhering to the book.

I also liked the plastic coating spray. It's tricky to use on a binding, since if it's sprayed unevenly it shows; on the other hand, if it had been around in the '40s, my Arkham House titles would still have their original bright black and gold. (Bright black? You know what I mean.) It also brightens and waterproofs paperback and magazine covers.

A couple of advisory notes . . . be prepared to buy in some quantity (25 is the usual minimum on covers of a single measurement). And while the catalog is lavishly produced, with color photos of almost every product, the descriptive matter is sometimes not as clear as

it might be.

My copy was obtained by simply writing to Brodart at the address given at the beginning of the column. And while it's aimed at libraries, I would guess that there would be no problems in ordering by individuals.

In future columns, I'd be happy to go into the matters of cataloguing a collection or prime SF collectibles, for instance. If this appeals, might I ask for some feedback from you, gentle readers?

A TALE OF TWO CITIES

by Jack C. Haldeman II

art: Alex Schomburg

It's actually all Mr. Gunn's fault: he wrote "On the Foundations of Science Fiction," and one of Mr. Schomburg's color sketches for the cover based on that article was so good that your editor began asking for stories that would fit the completed "Tower" cover. Here is Mr. Haldeman's contribution, one of his strange sports stories as well . . . :

Tad's grace period was about to expire. In two hours he would officially be an outlaw. As bad as that was, it was better than the alternative. Far better. They *couldn't* do that to him.

After all, he had season tickets.

A League skimmer careened around the corner, siren wailing, lights flashing. Tad slid into a doorway, blood pounding in his ears. Though technically he wasn't an outlaw yet, he felt like one. He stayed hidden until it passed, stepped out onto the empty sidewalk, drawing his black cape tightly around him.

Most of the people in the city had left, as ordered. He had never seen the streets so empty. The rest of them were sheep, all of them, doing what they were told without question. Tad marched to a different drummer.

He took the first left and wandered down the deserted side streets to his condo. Much to his surprise, his id-card still opened the lobby door. There wasn't anyone in sight, of course. They were all good citizens. Gone.

"Good evening, Mr. Barkham. There are no messages for you tonight." Tad ignored the speaker box, triggered by his card, and headed up the lift to his apartment. He'd better get everything he needed on this one trip. The city was sure to close down tight at midnight, at the end of the grace period. Only a hour and a half left.

His apartment was a standard two-person unit: bedroom, freshener, and living room. No need for a kitchen, he had a wall. He had moved into the apartment almost two years ago, when he and Sharon had signed the Conditional Living Together Contract, without the Children Option. He remembered that day well. It was the week the Rangers won the Galactic Championship.

He fought the sense of loss growing in the pit of his stomach. He'd miss Sharon and the good times they'd had together, but it had to

be this way. She'd left without a second thought, without question. It was the Law, she said, and she obeyed the Law. Besides, she never did understand his loyalty to the Rigal IV Rangers.

On the other hand, he had never really come to terms with her fanatical devotion to word puzzles of all types. They had things they shared and things they didn't, good times and bad. His feelings about Sharon were mixed. The two of them had woven a complicated web between them.

Now it was finished. She had gone, like the Law-abiding citizen she was. He had been forced to stay, at any possible risk. There had never been any choice. Damn the League and its Laws.

Tad walked to his window, palmed it clear with a wave of his hand. The city spread out below him in eerie darkness. Micanopy was the largest city on the planet, a Class 1-A city, stabilized at a population of 150,000, eligible for a deathball team. The view from his window was always an awesome sight, even more so tonight, realizing there couldn't be more than a handful of people left. Here and there the lights of a League skimmer broke the darkness, doubtless looking for hangers-on, outlaws like himself. The bums in Skid Row, with their daily allotment of government wine, would be the last to go. Besides himself, that was.

On a knoll beyond the city, the massive towers and buttresses of the transporter complex caught the light of the small rising moon. One rocket crossed the sky. A stream of people—stragglers—lined up to have their molecules disassembled and shipped across the galaxy. A single light burned in a window high in the tower: the League Commissioner was overseeing the operation in person.

All his life the transporter complex had stood outside the city in all its gleaming beauty. It had never been a matter of much concern to him before. It was used to ship goods from planet to planet throughout the galaxy. Sometimes it shipped people. Before all this happened, he paid scarcely more attention to it that he did his wall, which provided him with whatever he wanted, or a common vid-booth on any street corner.

Now it was different. The complex seemed evil to him, the lighted window was a beacon calling him to leave behind all he held dear. If only the Rangers hadn't been traded.

It had all happened so suddenly, without a bit of warning. One day life was perfectly normal, the next day everything was turned upside down.

There were few constants in life—birth, the dole, death, and the team. *The team!*

Deathball. The Rigal IV Rangers were League Champions for the third straight season. One hundred and sixteen kills and two hundred and fifty-seven maims last year. A record. And that was with McMurtry out with a crushed spinal column for the last half of the season. He was having a new one regenerated in the tanks and would be back next year.

But there wouldn't be a next year, as far as Tad was concerned, if the League had its way.

Traded! How could they trade a championship team? That kind of stuff only happened in the bush leagues. Not with a championship team! No matter what happened he couldn't bring himself to support the Sirius Wolfcats. Not in a million years. They hadn't finished better than fifth in twenty seasons.

The League had made a mistake this time for sure. The Commissioner was supposed to be infallible, but this showed he was as prone to mistakes as any mortal man.

The announcement had been full of double talk about economics and dwindling fan support in Sirius for their team. It all boiled down to one hard, cold fact: the teams had been traded. All the inhabitants of the Class I-A city on Sirius III would be shipped to Micanopy and all the inhabitants of Micanopy would be shipped there. All but Tad.

It made sense to transport the citizens rather than the team. After all, the people had plug-in life-styles, and owned no personal property. They could live anywhere. The team, on the other hand, inhabited a twenty-acre stadium, with features custom-built to each individual player's specifications. It was unthinkable that anyone else could occupy Tinker's pillbox, manipulate Greaser's flame-tank. Unthinkable.

Yet the other side of the coin was just as unthinkable. Tad knew that an apartment just like this one awaited him on Sirius III. It would have a wall that gave him everything, a view exactly like the one he had. His job would be identical, his standard-of-living index would be the same to six decimal places. Only one thing would be changed.

The deathball team would be the Wolfcats and not the Rangers. A difference as great as night and day. He wouldn't stand for it.

Tad turned from the window and went to his wall. He would need food, provisions, weapons. He had a half-formed plan to head for the Wastelands and hide out until the population switch was complete. Then he could make his way back into the city and somehow infiltrate himself back into society. He inserted his id-card into the wall.

"Good evening, Mr. Barkham," said the wall. "How may I serve

you tonight?"

Tad had heard that candy bars were good for quick energy. He would need energy for sure. The quicker the better.

"Candy bars," he said. "About five hundred of them."

"Override," said the wall. "I'm sorry, Mr. Barkham, but I am not allowed to distribute goods with a projected utilization date of later than midnight tonight. It would be wasteful. We mustn't have waste."

"How many can I have?" he asked.

"Two," said the wall. "Lo-calorie bars, though. Your auto-doc has you on a diet."

"Never mind," said Tad. "I'll have a drink instead. You *can* manage that, can't you?" he asked sarcastically.

"Certainly. What kind?"

"A Somtov cocktail."

A panel slid back, revealing a small glass filled with a frothing, bubbling fluid. He took it, sipped it slowly. It was a small drink, but potent. It had a kick like a bandit. He started to feel better.

He'd need clothes, several changes of clothes.

"I'd like two pairs of boots, three pairs of dura-slacks, some heavy socks—"

"Override. I'm sorry, Mr. Barkham, but I am programmed not to dispense articles of clothing that will not be used before midnight. You will find everything you need on Sirius III. If you desire an immediate change of clothes, please place what you are currently wearing in the chute and I will replace it with another set. Might I recommend a comfortable tunic? Just the thing to wear while transporting. Boots would be unnecessary."

Tad looked at his black coat with its red lining. It would do as well as anything else. The black would help him at night, and the red would blend into the clay of the Wastelands.

"I need a rifle," he said. "A stun-gun."

"I'm truly sorry, Mr. Barkham, but you are not authorized to possess Class II weapons."

"What kinds of weapons am I allowed to have?"

"Class I weapons."

"What are Class I weapons?'

"Class I weapons include rocks, sticks, handfuls of mud, pillows, knives, spoons—"

"Give me a knife!"

"Certainly."

The panel slid aside and Tad pulled the knife out. He was im-

mediately disappointed. It was a standard dinner knife, programmed to dissolve after fifteen minutes.

"Is this the best you can do?" he asked.

"I'm afraid so," said the wall. "I do have some nice rocks, though."

"Never mind. I think I can find my own. I'll take another drink, though. A Somtov cocktail."

"Sorry, Mr. Barkham. Only one a night. Doctor's orders, you know."

"How about a beer?"

"Sorry. The auto-doc says—"

"Shut up!"

"Certainly, Mr. Barkham."

This wasn't going to work, Tad could see that. He fought a feeling of rising panic. Time was running out and he was standing here talking to a wall. Things were getting bad, real bad.

"Mr. Barkham, you are putting yourself through needless worry and inconvenience," said the wall.

"Huh?"

"You will find Sirius III a pleasant place to live. It is obvious you are delaying your departure. This is senseless. You will be very happy on Sirius III."

"Don't tell me you've become my auto-shrink, too?"

"Of course not. But your resistance is obvious even to a Level 5 mechanism such as myself. My current input from Transporter Central indicates that 149,999 people have presented themselves for molecular disassembly. Since Micanopy is population-controlled at 150,000, that means there is only one person left. Since I am talking to you, you must be that person. I'm really ashamed of you. You've been such a nice tenant. You don't throw loud parties, you don't keep pets, and you don't leave the apartment in a mess. Why don't you just go like you're supposed to? You're not cut out for the outlaw life."

"How do you know I'm not?"

"Really, Mr. Barkham. I know you quite well after two years. You don't have the stamina or the drive to be a good outlaw. You wouldn't even make a very good bad one."

"I *have* to. You wouldn't understand."

"Try me. I can be quite understanding. It's in my programming."

"Well . . . " stammered Tad. "It's all like this—" Suddenly he stopped, looked at the speaker grill on the wall.

"Wait a minute. Is calling the League Patrol and telling them I'm here in your programming too?"

"Certainly."

"Are they on their way here?"

"Of course. I have been instructed to engage you in conversation until they arrive. Would you like to talk some more?"

"No. Yes. How long until they get here?"

"About thirty-five seconds. They are on the lift."

Tad ran to the door.

"Goodbye, Mr. Barkham," said the wall. "It really has been a pleasure serving you for the past two years. I am sure that you will find life on Sirius III most pleasureful. They have walls there, too. Just like me."

The wall was talking to an empty room.

"Have a nice day," it said.

Tad was already down the hall. He opened the door to the stairs just as the lift arrived.

He flew down the stairs, vaulting half a flight at a time. Fear was a good producer of quick energy, too, better than candy bars. It was fifteen stories down to the lobby. He was there in an instant and burst through the double doors only to be immediately surrounded by League Patrolmen.

He stopped short, his arms fell to his sides. It was hopeless. The League Patrolmen closed in on him.

They were towering specimens of humanity, looking even taller with their spiked shoes on. Their numbered jersies strained to enclose their heavily padded shoulders. They lumbered toward him, wrists and ankles heavily taped, their faces hidden behind the plastic bars that curved around the front of their brightly colored helmets.

They grabbed him roughly, dragged him through the lobby and into the street. There they threw him against the wall and frisked him.

"You are under arrest, Tad Barkham, for conspiring to evade a League Mandate. Punishment will be quite severe. As a citizen you had certain rights. As an obvious criminal you have forfeited most of those rights. In a short time you will become an outlaw and have no rights at all."

It was clear to Tad that the Patrolmen could hardly wait.

They shoved him around with obvious pleasure, warming to their task. No doubt they were trying to obtain a confession. He took a hard blow to the stomach when a League skimmer pulled up in front of the condo. The Patrolmen dropped him and snapped to rigid attention.

"Is that Barkham?" asked a voice from the back seat of the skimmer.

"Yes, sir."

"I want to see him."

"Yes, sir."

He was taken to the skimmer. In the back seat was an old man. Tad couldn't make out the face in the darkness, but his robes of office were unmistakable. It was the League Commissioner. In person.

"This man is not dangerous, Patrolman. I'll take over from here." The door slid open and Tad entered. The skimmer slid silently away from the condo toward the transporter complex.

"You're the last one," said the Commissioner. "There's always a last one." His voice was heavy with age, but showed no weariness at all.

"Always?" asked Tad. "Last one? What do you mean?"

"It happens every time," said the Commissioner. "Someone tries to stay behind. It never fails." He paused, settled back into the comfortable upholstery of the skimmer. The driver in front guided the vehicle effortlessly through the twisting streets.

"You really love the—let me see—Rangers, don't you?" he asked.

"Of course I do. They're the best. Number one."

"Being best isn't enough. There must be more to it than that. According to your wall, you are a fairly stable person. Your wall speaks highly of you. It must have taken a lot for you to consider breaking the law. Why did you try it?"

"Like I said, the Rangers are the best. They're champs. Tops in the League."

The Commissioner turned to Tad. His face seemed softened, not hardened by the years. "It's more than that, isn't it? You can tell me about it."

Tad was surprised. He'd expected an interrogation, a hard line of questioning. This man was more even-tempered than his autoshrink. It caught him off-balance. He spoke without thinking and the truth came out. The truth he'd never even admitted to himself.

"It's *my* team," he blurted out. "Look at me. I don't *own* anything. My clothes are mine only as long as I wear them. My apartment is mine only while I live there. I don't have one single thing that's *mine*. Except the Rangers."

Tears rolled down his cheeks, he looked out the window, away from the old man. The transporter complex loomed above them. They were almost there.

"They all say that," said the Commissioner sadly. "You just don't understand the economics of the situation."

Tad blinked the tears away. "Shove your economics," he shouted. "Nobody understands them anyway. I'm sticking with the Rangers. They're the best."

He made a false move toward the Commissioner, which caused the driver to slam on the brakes. Tad took advantage of the momentary confusion to slide the door open and leap from the skidding skimmer. He hit the ground hard, rolled to his feet.

"They all do that, too," he heard the Commissioner say. "He won't get far. They never do."

But they're not like me, thought Tad as he pushed through the crowd lined up at the base of the transporter. Docile citizens, they showed no resistance as he plunged through their midst and emerged on the other side. He ran.

Beyond him lay the Wastelands, behind him the mighty transporter complex. He ran as fast as he could, his cape flapping behind him. His feet flew over the ground, jumping depressions, dodging the undergrowth that tugged at his legs. Behind him another rocket passed across the sky. Suddenly a ball of fire erupted on the horizon over his shoulder. It was a low-yield nuke. Even as their fans were being shipped away, the Rangers were practicing. He smiled. It was a beautiful thing to see. It was the last thing he saw.

A stun-gun caught him in mid-stride. It stopped him cold, a frozen figure with a flapping cape. The transporter complex rose behind him, reaching to the sky. One lighted window: the Commissioner watched him. He saw Tad fall.

The first Patrolman picked up Tad's limp body. "This guy's a real sickie," he said.

"No matter," said the other Patrolman. "Whan they disassemble his molecules they can put them back together any way they want."

Tad was hauled to the transporter complex like a sack of grain, though with considerably less dignity.

He opened his eyes, blinked, tried to focus. Everything was a shifting blur.

"Want a drink of water?" asked a female voice. "It'll make you feel better."

Tad sat up in the hospital bed, accepted the glass of water. Someone put a wet cloth over his forehead. It felt good, and when he opened his eyes again he could see.

Sharon.

"What are you dong here?" he asked.

"I wanted to come," she said. "They said I could. How do you feel?"

"Okay," said Tad and it was the truth. He felt better than he had in a long time. Things looked pretty good on Sirius III. "Are we together again?" he asked.

"Sure," she said. "We've got a super nice apartment. The wall's real friendly. Nice view of the city. Want to come see?"

"Can I? Will they let me go?"

"They said you could leave as soon as you woke up. They're nice people here."

Sharon helped him dress and they left the hospital, headed for the local skimmer that would take them to the condo.

Beyond the hospital Tad could see the shining towers of the transporter complex. It sat on a jagged cliff, not on a rounded knoll. Somehow it looked better that way, more natural. The sky was filled with rockets, as it should have been, not like the old times. A huge moon hung low in the sky. It looked comfortable, familiar. Like everything else around, it had a sense of *rightness*. It sure felt good to be on Sirius III.

Home of the fighting Wolfcats.

Scrappiest team in the League.

His team.

EINSTEIN'S DISTRESS

Δp Δx,
Werner K. Heisenberg
Claimed that our
knowledge of
Atoms has gaps.

Einstein, distressed by such
Discontinuity,
Said that the Almighty
Does not shoot craps.

—Poul Anderson

(The Greek letter Δ is pronounced "delta.")

PENZIAS'S PHONE

Higgledy-Piggledy,
Arno A. Penzias
Hung up the phone and then
Ordered a trace.

"Robert," he whispered, "We
Just got a call from a
Semidetectable
Breather from space."

—Carl Holzman

(Arno Penzias and Robert Wilson were working at the Bell Telephone Laboratories when they discovered the three degree microwave background radiation.)

NO VACANCY AT ALEPH-NULL INN
by Martin Gardner

The essential thing that you must remember in working this puzzle sequence is that infinity goes on without end—forever and ever.

Our universe has an enormous but finite number of suns, and consequently a large but limited number of planets. Although the number of intelligent beings on these planets is much larger than the number of planets, it too is still a finite number.

However, an infinity of universes lie side by side in a higher spacetime just as the two-dimensional leaves of this magazine lie side by side in our three-dimensional world. Spinning at the center of the Milky Way galaxy is a black hole. An opening in the hole's singularity leads into the Black Tube, a tube that extends like a monstrous worm along the fourth coördinate of space and provides easy access to the infinite number of parallel universes. Inside the Black Tube is a lavish resort hotel known as the Aleph-Null Inn.

The Inn is rather large. In fact it has an *endless* number of rooms. The rooms are numbered 1, 2, 3, 4, 5, . . . and so on to infinity. The hotel is a popular vacation spot for intelligent beings living in the infinity of parallel universes that are reachable through the Black Tube.

On one occasion, when all rooms of the Aleph-Null Inn were occupied, a creature crawled off a spaceship from Andromeda. He entered the Inn and loudly demanded a room.

"Do you have a reservation?" asked the clerk, a female who vaguely resembled what on Earth we call a kangaroo.

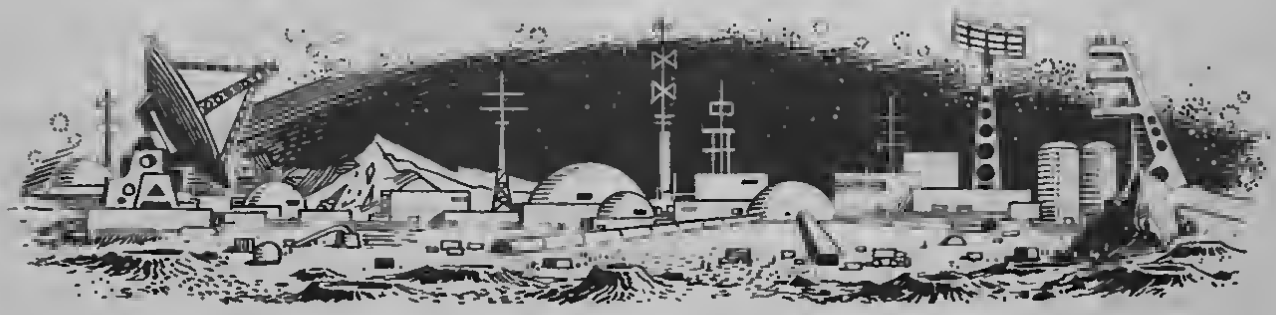
"I do not," rasped the creature, who looked like nothing on Earth. "I didn't know I needed one. Don't you have an aleph-null number of rooms?"

"We do," said the clerk. "But at the moment every room is occupied."

The creature extracted a thousand-georg bill from his analog of what we call a wallet. "Maybe this will help you find a room for me."

The kangaroo, after glancing around the lobby to make sure no one was watching, slipped the money quickly into her pouch. "I think we can accommodate you," she smiled.

How did the Inn find a room for the creature from Andromeda without forcing any occupants to double up or to leave the Inn? See Page 87 for the answer.



ON PLAYING RÔLES: A SECOND LOOK

by John M. Ford
art: George Barr

Games based on science fictional or on fantasy settings continue to be popular. Here, another in an irregular series of articles on that field from Our Man in Bloomington, Indiana.

About a year after we last examined adventure rôle-play games ["On Evenings Beyond the Fields We Know," August 1979], what began as an exotic parlor pastime has become part of the culture: there have been articles in the national press, game designers interviewed by Tom Snyder, and a very bizarre disappearance. (Kidnapping? We may never know)

The previous article was a broad, general explanation of the adventure idea. Now that the idea has become widely known—if still exotic—it seems appropriate to take a specific look at the games on the market.

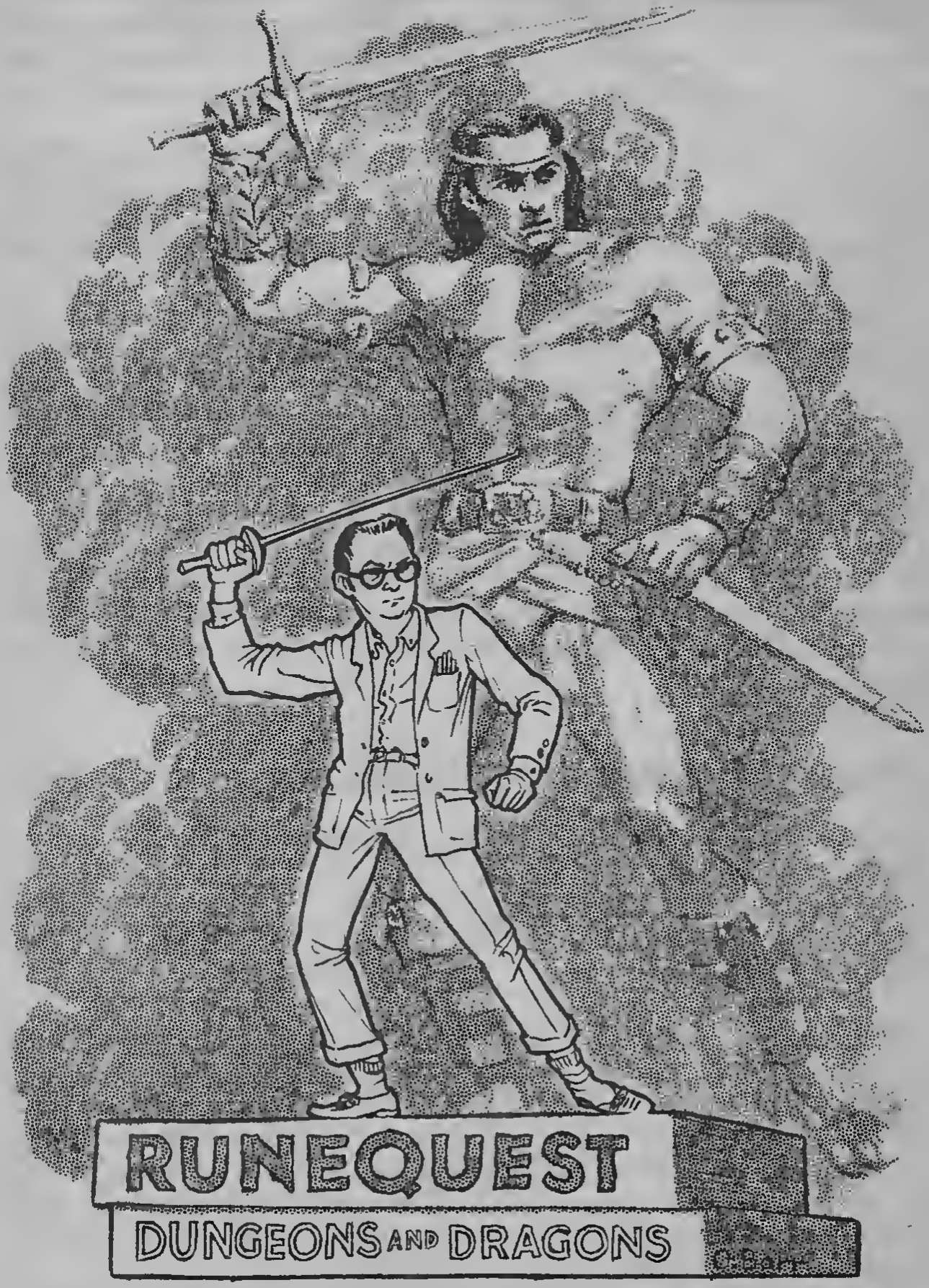
Games such as these—more properly, rulesets—do not lend themselves well to brief-notice reviews of the kind given books. Game rules do not have secret plot twists, they are not read once and judged; they are played with, they *work*—and sometimes fail to work. A game review must therefore be a structural criticism, showing not only what but why.

This does not mean that you are about to read—or quit reading—an elaborate, esoteric technical analysis of dice probabilities and the kinetics of two-handed swords. Think of this rather as a sort of *Hyborian Consumer Reports* (with apologies to both that magazine and the nameless editorial horde of *Amra*).

Because of the need for depth and the limits of space, only two of the numerous available rulesets will be reviewed in this article. If the response so indicates, others may be covered in future articles.

The games reviewed were chosen because both are generally available, and they have been around for a while, long enough to develop a following.

Another criterion: The "first generation" of RPGs [Rôle-Playing Games] were sketchy, were often less game-systems than outlines of such, requiring extensive patching and filling by Gamesmaster and players before play was possible. These games are "second-generation," complete—at least according to their advertising.


RUNEQUEST
DUNGEONS AND DRAGONS

A last factor is that the rulesets here covered represent different concepts and philosophies of game design—matters of approach and intent as well as detail. For this and other reasons, neither of the games has been selected as "best." Each answers specific wants and needs; the player must personally determine what he or she desires from the game being played.

Though s/he goes by many names, in this article the player who creates, operates, and referees the game world will be called the "GM," for Game Master or Mistress. The present author will indicate himself by first person singular; "author" will mean the writer/designer of the rules under discussion.

Finally, it is in the nature of criticism to be critical. The previous article dealt with the social aspects of adventure gaming; the present discussion is of hardware—where it functions, where it does not, and why. Games are of course made for enjoyment, not to fulfill arbitrary standards of perfection—but some standards are not arbitrary. Books are also made for enjoyment, and honest critical examination has never yet killed a book that deserved to survive.

Put another way: all poker games use the same basic principles, but there are hundreds of versions of poker. Card experts such as Scarne and Jacoby have written books that say, "These games are sound and enjoyable; these others are a waste of your time and money."

That's the idea.

ADVANCED DUNGEONS AND DRAGONS

TSR Hobbies, Box 756, Lake Geneva WI 53147
Monster Manual—$11.98
Player's Handbook—$11.98
Dungeon Master's Guide—$14.98
Designed by E. Gary Gygax

The original *Dungeons and Dragons* (usually abbreviated *D&D*), published in 1974, was the first commercially-available fantasy rôle-play game. It had its problems, most severe of which was very poor organization as well as major gaps and ambiguities in the meanings and uses of important rules. It was, in fact, not possible to play with the original three-book set without imposing several house rules and interpretations—some of which proved to be not at all what the designers had in mind.

Many supplements and play-aids followed, from TSR and others,

attempting to solve these problems. More than once it was suggested that what *D&D* really needed was not patching and supplementing, but a complete overhaul, front to back, and the hand of a competent editor.

Now we have *Advanced Dungeons and Dragons,* which claims to be just that revision. TSR advertising casually tosses around words like "ultimate." The package, three case-sewn hardcover books, is impressive.

Is *AD&D* an improvement on the original? Definitely. One can study these books and, with the usual props of dice and graph paper, construct a "dungeon" and go adventuring.

The first volume published, the Monster Manual (MM), contains tabular data, descriptions, and illustrations of the beasts that inhabit the *AD&D* universe, alphabetically from Aerial Servants (a sort of low-grade angel that assists Clerical types) to Zombies.

The second volume, the Player's Handbook (PH), has the information generally available to inhabitants of fantasy game worlds: the types of characters, their requirements and abilities; prices of standard equipment; spell lists for those with magical abilities.

The Dungeon Master's Guide (DMG) contains that information normally the exclusive property of the GM: background notes, case examples ("What if I cast the Wall of Stone spell as a bridge?"), lists of magical gadgets and their powers. There are also many suggestions on how to set up and operate the game—something long needed.

This division into volumes makes sense from the GM's standpoint: the secret workings of the world stay secret—and from the players' viewpoint as well: they need not buy more books than are actually necessary to play the game.

It has been said (and in fact was suggested to TSR) that loose-leaf bindings would have been a more useful format than hard boards. The book covers are garishly colored; those for the MM and DMG are exceedingly ugly as well.

AD&D rules are relatively simple and straightforward, though there are a lot of them. There are frequent comments on the complexity of other rulesets; some of these comments are rather sharp, and many seem aimed at an audience much younger than the college-and-up group that first made rôle-playing popular.

Combat in the game depends on a single roll of a twenty-sided die, with modifiers for unusual physical abilities and type of weapon used. No choices are involved, other than original selection of weapon and armor. Damage done by a blow is also determined by

weapon type, and is scored against a simple linear scale of "hit points." When hit points are reduced to zero, the character is dead. (In one of the few optional rules sections, characters may be given a range of "negative hit points," in which they are alive but critically hurt and in need of aid.)

The system is quick and simple to use, if a little undetailed—characters' point totals bounce up and down, without any permanent hurt being suffered from all that fighting. The author says: "The location of a hit or wound, the sort of damage done, sprains, breaks, and dislocations, are not the stuff of heroic fantasy." (DMG, p. 61) This would seem to ignore the Ringbearer's wound on Weathertop, the Dolorous Blow struck Amfortas, or any of the many other specific hurts that have shaped the careers of heroes and villains.

Characters capable of magic memorize spells to a limit of mastery; when recited, these are forgotten and can not be re-used—rather like bullets loaded into a gun. This system was taken, more or less, from Jack Vance's *Dying Earth* stories. Also required is a "material component"—some physical item that is used up in the cast, such as a seed, a gem, or an inked rune. This seems to have been added in response to comments that, while the mechanics of *D&D* magic were simple (write the spell down when memorized, check it off when used), they bore no resemblance to the magic of folklore—or, for that matter, most fantasy fiction. A "rationalization" of magic, involving something called *dweomer,* is presented piecemeal, but never jells into a coherent whole. The reader is finally referred to the works of Vance and John Bellairs.

Another difficulty with original *D&D* magic was that there were loopholes and logic lapses in the descriptions of how spells functioned. Some of these have been well and tightly mended. Some have only been made worse. There is no consistent relationship between the level (difficulty) of a spell and its physical power—something one might find in reality but which certainly is not proper in a game.

In the description of the "Clerical Command" spell (PH, p. 43), which allows one-word orders to be given, "Suicide!" is forbidden as a command "because *suicide* might be a noun." Yet case examples are given for *back, fall, fly,* and of all things, *die*—one of the most frequently used nouns in the book!

In a way, all these problems are the same: there is no organized explanation, no *system,* of *AD&D* magic; there are merely some descriptive words (this spell is an Evocation that dweomers the door,

etc.) tacked on after the fact.

The philosophy (there's that word) of *AD&D* is Anything Goes; any item, creature, or character, so 'tis said, can be written into the system. (I well remember the arguments as to what level of Magic-User Gandalf was, and the list of game-factorings of Lovecraft's Cthulhuoid creatures.) The GM is encouraged to toss anything that catches his fancy into the game, without regard for logic and consistency. (He is warned, however, that any *purchased* materials not approved by TSR will damage his game. And there are constant exhortations to maintain "game balance," which seems to be defined as not letting the player-characters win too often.) The DMG contains rules for connecting *AD&D* with the same publisher's Wild West and post-Bomb rôle-play games.

Now, one of the great features of this kind of game is its flexibility; the power to make the game into whatever the participants want. And if they want a deuces-wild universe where the Fantastic Four can plunge into Castle Gormenghast to recover the Ring of the Nibelungs—well, nothing *anyone* says is likely to stop them.

I am not sniping at anyone's style of play. I've run some of those wild-card games myself; and they're a lot of fun, for a while. But eventually the dazzle fades, the shock effect of submachine-guns-and-unicorns wears off. What, then, about the GM and players who want a more limited, subdued, and—more importantly—internally consistent game? What has been done for them?

Unfortunately, not very much. Dungeonmasters (this is TSR's term, and their consistent use of it rather than "game-" or "world-master" indicates the confines of their thinking) are told, often, to pick and choose among the rules as they see fit. But there is no sign of how the rules so chosen are to be made to work together.

Suppose, for example, the GM decides not to have Druids in his world—they are, after all, pretty culture-specific. Can the Druid magic spells (most dealing with nature) then be assigned to other characters? On what basis? When a Druid is encountered on a chart or in a preplanned adventure, who or what can be substituted?

Some types of characters given in the books, most notably Assassins, are presented with the admonition that they are "too powerful" to be operated by players. Something is wrong here. Why have these types (who, after all, are human beings) been given such powers? Certainly some types are unsuitable for adventures—sages sit around thinking all day, cooks and bakers don't get out much either—but to first build a "supertype" and then to put an arbitrary ban on its use does not seem like very good design.

Upon examination, most of the "GM guidelines" turn out to be advertisements (". . . only those [products] noted as *Official* or *Authorized AD&D* products should be accepted." —DMG, p. 11, original emphasis), irrelevant to the rules (e.g. how to handle unruly players), and tables to make random those game elements that most call for thoughtful planning—governments, religions, and so on.

Without intending to impose a phony "educational" purpose on the game, it might be pointed out that in the past, GMs studied the real world and real folklore to add color and detail to their imagined worlds. Creativity was sparked.

Not here. Participants are instructed to obtain only those materials with the publisher's seal of approval. Details of society can all be found in the DMG. When an outside reference *is* given, it is not to a primary source but to a piece of modern fantasy—and those are not even carefully chosen. Further, many of the charts given as "aids to world design" are seriously distorted or just plain wrong.

And since variant-rules games have been running since the rules first appeared—in fact, given the vagueness of original *D&D,* it could be argued that nothing *but* variants exist—the warning to avoid such games because they will "wither" is rather ridiculous.

Well, now: who is going to be disturbed by all this? Perhaps not many at all. *AD&D* can and will be played and enjoyed widely, particularly by the younger players who want to "kill monsters and grab treasure" —because fundamentally *AD&D* is an action game, not a psychological one as are some other rôle-play games. This understood, it can be said that a table that confuses schizophrenia with multiple personality, or one that puts the noble rank of Baronet (created in the 17th century) into the Middle Ages, will not matter to most players—and the rest will probably be inclined to create their own such tables anyway.

But if the errors are not worth noticing, surely the carelessness that caused them *is?*

There is a basic and serious misunderstanding here. The author repeatedly refers to fantasy and to his game as "illogical." Apparently he is unaware of the difference between illogic and imagination, and of how insulting this statement is to fantasy writers who take care and pride in their work. What, after all, is *The Lord of the Rings* if not a triumph of internal consistency and reasoned construction?

This is a game with many good and playable rules—but without any system underlying those rules. The kitchen sink approach governs all. And there is nothing wrong with that sort of plumbing,

provided that the potential player—and especially the potential GM—is aware of it and willing to either play along or exert the effort necessary to build a framework underneath the chrome.

And when we're talking about games, isn't "ultimate" a word without meaning?

RUNEQUEST

The Chaosium, Box 6302, Albany CA 94706
120-page rulebook—$11.95
Designed by Steve Perrin, Ray Turney, Steve Henderson, and Warren James

And now for something completely different:

Runequest, unlike most RPGs, is set within a specific imagined world. Glorantha, first created in 1966 by Greg Stafford, is a planet poor in ferrous metals, which only certain cult initiates may work; the predominant metal is bronze. Gloranthan culture has an elaborate mythology and numerous small religions (called cults) instead of strong central faiths. The overall "feel" is Near Eastern rather than Western European.

Interestingly (and, it must be noted, completely coincidentally) much the same situation applies in M.A.R. Barker's *Empire of the Petal Throne,* published first by TSR Games' ancestor Tactical Studies Rules in 1975 and now published by Zocchi Enterprises (01956 Pass Rd., Gulfport MS 39501). *EPT,* the lifetime creation of philologist Barker, was a marvelous achievement of imaginary society. As a game it was much less successful, since its rules were first-generation *D&D* grafted on without regard for the unique features and possibilities of Professor Barker's world Tékumel.

No such problem applies to *Runequest.* The game system is both original and closely integrated with the background, since—unlike *Petal Throne*—the world designer was present at and involved with its creation.

Runequest characters start with the usual set of personal requisites: Strength, Intelligence, and so forth. They will also have a societal background, and may belong to a semihuman or nonhuman race—and these are genuinely different from humans in game-play. In some games a player-character troll is just a big, dumb, tough, ugly human. In *Runequest,* Trolls have their own society, gods, reasons for being. (They're still big and dumb and tough and ugly, by human standards.)

Characters also have skills, and the skills system is the best feature of the game mechanics. Instead of skill magically (you'll pardon the expression) appearing upon the accumulation of *n* experience points, characters must go to the sources of knowledge. Some skills are available in one's home tribe (or city or whatever); some are learned from professional instructors, for money; some are available only to the members of specific cults. Each skill that a character possesses has a mastery number, from 1 to 100, attached. Mastery increases through use of the skill, and through purchased training.

This does require an involved, almost baroque, character record sheet; samples of these, suitable for copying, are included.

All these rules are presented with explanations of "The Reason Why" each rule is present, as well as an ongoing story that illustrates both the application of the rules and the flow of the game. No other ruleset shows quite so well how the game is to be *played.*

Treasure has always been a problem in RPGs: not its lack—far from it! —but its lack of utility. Paper gems do not glitter; an expensive paper meal tastes no better than a cheap one. Even in adventuring equipment, there is a limit to the amount of military tinware a character can carry around. *Runequest* solves this problem most elegantly. Treasure once acquired is spent on training, both providing a real reason to acquire hard money and taking it out of the players' hands.

But it isn't all cash-flow statements. Much more important than the Loot Problem has been the Classes and Levels Problem. Fantasy RPG characters tend to be filed in tight pigeonholes: 3rd Level Magician, 5th Level Fighter, 22nd Level Insurance Salesman, that sort of thing. In *Runequest* a character may at once be an Impala clan barbarian from the plains of Prax, a master swordsman, a former lay member of the Storm Bull cult who is now a Rune Lord of the cult of Orlanth Adventurous, with spells including Bladesharp and Farsee—

In other words, characters are round, complex, and best of all, unique individuals.

Runequest combat involves a roll of percentile dice, modified by weapon skill, personal abilities, and the target's defensive abilities. If a hit is scored, another roll determines its location, and another, dependent on weapon type, determines amount of damage done. Armor on the area struck will absorb some of the damage. There are also chances for critical hits, which ignore armor protection, and impalements, which double damage from long pointed weapons such as spears.

This system is moderately complex. Choices available are primarily of weapon and armor types. The hit-location system means that characters need not wear homogenous armors (all metal, all leather, etc.) but may mix types. Combat is extremely deadly; it takes no more than a couple of well-aimed blows to damage a limb beyond natural healing, and healing spells are not the every-party's-got-some proposition of other games. (High lethality in combat does tend to make players seek alternatives to fighting, which I find a welcome thing.)

Runequest magic is of two types. Battle Magics are available to anyone (who can find a teacher, anyway). Rune Spells, much more powerful, are available only to cult Initiates (of which more later). All magic involves the investment of a character requisite called, logically enough, Power. Some spells are "reusable"; others must be paid for each time they are used.

This magic system is simple and straightforward, which makes practical another feature: instead of a huge master-list of spells, there are many short lists, one per cult. Thus the magic one learns must follow the lines of the philosophy one has chosen.

Most RPGs ignore religion. This seems contradictory, since practically all of the games have some kind of "priest" or "cleric" character type; but a not-very-close examination shows that these types are actually specialized magicians, usually combat medics.

In *Runequest,* a character's religion—expressed as membership in a cult—is vitally important. Unlike the old fantasy RP distinctions of Good, Evil, Law, and Chaos, which were used primarily as excuses to kill something differently aligned, the cults system defines a character, puts reasonable constraints on behavior, and provides a route to power through initiation into the higher mysteries.

Most cult members are Lay Members. The requirements for admission are usually few: race, birth, abilities, a fee. Lay membership gives access to cult skills and Battle Magics, often at reduced cost. Some cults provide room, board, and healing services.

After a period of time and the fulfillment of certain personal requirements, a character may apply to become an Initiate. There are two types. Rune Lords are heroes-at-large in service to the cult and its god. Rune Priests direct temple services and are the direct link between members and deity. In exchange for their special powers and privileges, Lords are required to perform great deeds, Priests to give up much personal freedom.

Rune Lords may also acquire the ability to work iron, which makes weapons and armor far superior to those of Gloranthan bronze. Pro-

vided, that is, that they can find the stuff.

A character who changes cults may, depending on the nature of the cult and the depth of his involvement, face penalties from a small fine to combat with a powerful spirit, monster, or demon.

This cult business may puzzle some and put some off, but it is an important step in RP gaming: not just because it adds depth to the game background, but because it gives characters something they have not had before.

Characters "fight and die" a lot in fantasy RP, in order to kill monsters and take their treasure, or to get something called "experience" which will make them better able to kill monsters and take their treasure; armored hamsters on a wheel. One can of course play *Runequest* in this fashion, but how much of a difference it makes to have characters fighting and dying for beliefs and causes instead. The game becomes what it allegedly was all along: character rôle-playing. (I hasten to add that many people *were* playing in this fashion from the beginning—but this is the first commercial ruleset to build the idea into its structure.)

There is, unfortunately, a price for all this philosophy, and it is this: To enjoy *Runequest* completely requires that one enjoy, that one get involved in the world of Glorantha. Not everyone is going to do that. Some elements of the game in fact work against the illusion: the metal called "bronze" differs markedly from the Earthly article; and the Gloranthan races of Elves, Dwarves, and Trolls—among others—do not match the images evoked by those names. (Though this is hard to entirely condemn—I find the authors' creations much preferable to another batch of imitation Tolkein characters.)

Now, there is no problem if you are a ruleswriter and worldbuilder; the *Runequest* game systems will transfer easily to a different culture, and the authors have included suggestions to help the job along. But not everyone can go to these lengths.

This is an awkward note to end upon—rather like saying "the cake is delicious, but you may not like the icing." Certainly no one should be frightened away from Glorantha simply because it is different, especially since so much care has been taken to make *Runequest* usable by the novice or occasional player.

And it's *good* icing; just a very distinctive taste.

EXTRODUCTION: ON SUPPLEMENTS

Books of this type beget books: rules additions and clarifications,

variants, aids to design and play. A few of these were mentioned in the reviews; following is a highly selective list of some of the better material available both from the original publishers and others. Due to the instability of *real* gold pieces, prices have not been given; a stamped, addressed envelope to the publishers (not, please, this magazine!) should bring current information.

For *Advanced Dungeons and Dragons,* TSR Games publishes prebuilt "dungeon" and "wilderness" adventures of high quality. These contain maps, descriptions of the local inhabitants fair and foul, and what treasures await the victor. Recent releases have included illustrations of dungeon features, occupants, etc. to aid in visualization of the scene. They also publish a magazine, *The Dragon.* The Judges' Guild [1165 N. University, Decatur IL 62526] produces several such adventures and play-aids, Officially Approved by TSR; the most interesting of these is the "City-State of the Invincible Overlord," an enormous walled city (the map is about three feet square, and comes with a thick guidebook). Unfortunately, JG's work suffers from haste and almost nonexistent proofreading. Not Officially Approved, but of interest to the GM in search of ideas, are the three volumes of the *Arduin Grimoire* by Dave Hargrave [Grimoire Games, 2428 Ellsworth (102), Berkeley CA 94704] which contain new spells, monsters, and other details from Hargrave's high-powered world of Arduin.

Runequest's publishers offer several scenario packs. One of the best is *Snake Pipe Hollow,* which not only defines an area but provides several possible approaches to adventures there; most of these go beyond mere looting. It is typical of The Chaosium to back up its products with such suggestions for using them. Background packs, books of pre-created characters, are available—given the individuality of *Runequest* characters, these are more valuable for the price than most such lists. The book *Cults of Prax* details fifteen Gloranthan cults and rules for creating cults (including non-Gloranthan ones); this is a strongly recommended purchase. Two additional rulebooks, *Heroquest* and *Godquest,* dealing with earlier periods in the world's history, are in preparation. Chaosium publishes two magazines: *Different Worlds,* a general gaming magazine, and *Wyrm's Footnotes,* dealing specifically with Glorantha. Finally, there are two board games set there, *White Bear and Red Moon* and *Nomad Gods;* a third, *Shadows Dance,* has been announced.

NICHE ON THE BULL RUN

by Sharon Webb

art: Alex Schomburg

Then, in an incautious moment, we described the cover sketch to Mrs. Webb and Mr. Sucharitkul, who first planned a collaboration but then decided to write separate stories, each based on the other's ideas.

Lightship House
Bay of Nevermore
Hyades III 426984721

June 7

Somtow P. Smith, Attorney at Law
Smith, Smith, Smith, and Wu
59 Embassy
Chattlanta, United Earth, Sol 094266741

Dear Mr. Smith:

I, Terra Tarkington, want you to sue the Interstellar Nurses' Corps on my behalf, because I have been grievously wronged and injured by them.

I, a poor innocent girl of Earth (RN by profession) fell into the clutches of the Corps due to the false advertising they put out (deliberately and with malice aforethought) in order to lure me and others to our destruction.

"Join the Interstellar Nurses' Corps and see the Galaxy," they said. Well, believe you me, Mr. Smith, the only part of the galaxy I have seen is Taurus—and if I never see the Bull Run again I would not mourn.

Never complaining, always the professional, I risked life, limb, and sanity for the Corps, but now they have gone too far.

Nowhere in my job description did it state that it was my duty to be eaten by aliens—*nowhere,* Mr. Smith. Furthermore, my contract expressly forbids abondoning me on a hostile world for an indeterminate time, but they did.

I could die here, Mr. Smith.

And if I expire on the desolate face of Hyades III, I want you to sue anyway and send the proceeds to my dear mother, Gladiola Tarkington, who is entitled to recompense for the loss of her only daughter, Terra.

I suppose I ought to tell you all the horrendous details so you can prepare my case while I await my fate at Lightship House.

It all began when Dr. Brian-Scott (who is my beloved) and I were on board ship heading back to Satellite Hospital Outpost. Suddenly, we decelerated so fast that I ended up clamped in the lap of the Aldeberan steward. He was as rude as he could be about the whole thing, hissing and lashing his tail around, and in general making a scene. Now, I ask you, Mr. Smith, if you (through no fault of your own) were impaled against a giant blue Aldeberan lizard, wouldn't

you at least expect him to be civil?

Anyway, the reason we decelerated was because of a failure of the navigational beacon on Hyades III. Since the beacon was out, we didn't change course on time. We were on a collision course with one of the Hyadean outworlds until the safeties took over and decelerated us.

Well, nothing else would do the captain except to go back and investigate. So, we tracked in on manual and landed on this awful place.

It was dark. (It's dark most of the time on the Bay of Nevermore.) It was especially dark that night because only one of the moons was up, and because we had landed on the black sands near the Lightship House.

The Lightship House stood all by itself and what moonlight there was glittered on its tower. It was eerie.

Now the tower is supposed to be completely automated, but there was a light shining way up high from a single window. Talk about spooky— I was getting the jits over it until Dr. Brian-Scott said, "The light's there because of an old custom."

He said that back in the dark ages on Earth, people built lighthouses to guide ships that floated on water—and someone actually lived in the lighthouse so as to keep the light going. Can you imagine?

Well, with the mystery gone, it was getting boring on the ship, so Dr. Brian-Scott and I got permission to debark and walk around with the Aldeberan steward while the captain went to the tower to investigate.

That was a mistake. As soon as my feet touched the ground, they sank four or five centimeters. It was *wet* underfoot and the sand gave out a moaning sound at every step. Everything smelled murky.

The Aldeberan steward leaned back on his tail (the way they do when they ponder deeper meanings) and said, "It is-s-s s-s-strange indeed. We are no more than twenty meter-s-s from the tower. The bay has-s-s never been s-s-so close-s-s."

Well, I didn't see any bay at all. I know it was dark, but if there were a bay around I would have heard it, wouldn't I? And so I asked the steward what he was talking about. It turned out that the Lightship House is at the narrow end of a funnel. When the tide is out, the tower is landlocked, but at high tide the tower stands near the shore of the Bay of Nevermore. At least, that's what it was supposed to do. Now, it seemed from the condition of the black sand that the base of the tower had been flooded—and not too long ago.

It doesn't take a giant intellect to realize that tides that go out come back in. It seemed to me that we were demented to go walking around on what was going to be the bottom of a deep place at any moment. So, I hollered, "Let's run," and started to sprint back to the ship.

In less than a galac-tic, I banged my toe on something in the dark and went flying. I landed face down in that smelly ooze with black sand plastered all over my nose.

Dr. Brian-Scott shined a light on me and said, "Oh, Terra—"

Mr. Smith, has your beloved ever seen you with gooey black sand glopped all over your face? You can imagine how embarrassed I was.

I had tripped over a H'ohDaddi.

I don't suppose you know what a H'ohDaddi is. I didn't know either. H'ohDaddies are one of the life-forms on Hyades III. In their larval state, they swim in open water. Then they implant in colonies on the inside of the lava tubes that lie around on the bay shallows. When they implant, they grow into something altogether different. They're pink and sort of velvety, and they grow a grotesque toothy maw on one end that acts like a valve.

Just then, the captain came running out of the tower howling like a hound. He had this absolutely hag-ridden look on his face and his cape was flying behind him so that he looked like a maddened bat. He was yelling, "H'ohDaddi, H'ohDaddi, H'ohDaddi, H'oh—H'oh—H'oh. . ."

He ran for the ship, yelping all the way. But, all of a sudden, a rumbling drowned out his voice.

It was the tide. It was coming in *fast*. One moment we were standing on Hyades firma and the next we were boiling around in smelly bay water up to our necks.

I heard an awful strangling sound from Dr. Brian-Scott. "Terra—glug—I can't swim!"

I reached out for him, and he clamped onto my neck like an octopus. Well, we both nearly drowned.

And believe you me, Mr. Smith, it was every being for himself. The Aldeberan steward took off alone, flailing his tail behind him, while Dr. Brian-Scott and I churned off together more dead than alive.

The tide ran incredibly fast, and it was aiming us at the tower.

It's hard for me to relate what happened next. The mind tends to reject certain things. I managed to grab hold of a projection at the base of the tower. For a second I thought we were safe. Then, an awful suction came—a sort of slurp—and Dr. Brian-Scott and I were

swallowed up by the tower.

Mr. Smith, can you think what it is to be swallowed up? It isn't pleasant. *Not at all.*

The tower had become a giant H'ohDaddi. And we were headed for its open maw.

It was then that I knew what sheer terror was.

The H'ohDaddi kept sucking, and we went gurgling in on top of a siphon of water. Then I heard the most sickening sound there is. I heard the maw clamp shut behind us.

Well, you talk about into the jaws of death . . .

We were thrown into what used to be the control room of the tower. We would have been killed by the impact except for the H'ohDaddi. It had grown over every surface so we landed on spongy flesh instead of metal.

As the water drained off, we saw that the H'ohDaddi had even grown over the lights so that they glowed pink. Through them we could see the darker blood vessels.

A lot of other stuff had been sucked in with us—little ghost scuttles ran around our feet; and, as we watched, one ran over a patch of H'ohDaddi that was darker pink than the rest. As soon as it did, some sticky juice squirted up out of the H'ohDaddi and snagged the poor little scuttle.

It was horrendous. As we watched, the scuttle dissolved until there wasn't anything left but its shell.

When that happened, I began to cry and Dr. Brian-Scott took me in his arms and said, "We'll get out of this somehow, Terra."

Well, you talk about a black moment, Mr. Smith. I mean, I have been in lots of fixes, but this was the absolute worst. Here we were, huddled in the rapacious belly—so to speak—of a H'ohDaddi and about to be digested.

The only way out was down. Just below the control room was another room that had been used to store replacement parts for the beacon. Dr. Brian-Scott and I started to crawl down the opening in the middle of the room. What used to be a circular stair was covered with velvety H'ohDaddi.

I went first. I put my foot on the top step. It was cushiony and slicker than greased Pleiadean Pookah poop. My foot went out from under me and I hung balanced on the step long enough to see my life flash before me and then I somersaulted off and landed on my back. I sank up to my nose in folds and folds of H'ohDaddi.

Even though my ears were muffled, I could hear my beloved holler, "Watch out for the dark pink patches, Terra."

I have been in dire straits before, and I would choose the direst of straits anytime over a H'ohDaddi. I didn't dare move for fear of being dissolved.

All around me I could feel the folds of the H'ohDaddi throbbing. It was a rhythmic pulsing and it made a sound—glub-glop. At every glub, the folds billowed over my nose and nearly smothered me. When it glopped, the folds parted a little so that I could see a dim pink glow.

I began to cry again. It was grossly unfair that I, Terra Tarkington, who had survived plague and pestilence on the Bull Run, was going to spend eternity sunk in a H'ohDaddi crevice, there to waste away to a shadow of my former self.

Then I heard Dr. Brian-Scott yelling, "Terra! Where are you?"

The only time I could answer was when the H'ohDaddi glopped. When it glubbed, I could only rail against my fate and try to keep my nose out of the folds.

After what seemed forever, a light beamed in my eyes, but in a moment the glub shut it off. When the glop came, I reached out to my beloved, through layers of H'ohDaddi and he grabbed hold.

Somehow he braced himself and pulled me out of there.

That's when I discovered that the glub-glopping was from the H'ohDaddi's heart. Dr. Brian-Scott shined his light over it. It was a primitive two-chambered heart shaped sort of like a figure eight and buried in pink flesh.

I wanted to get something and kill it then and there so as to save ourselves, but Dr. Brian-Scott said, "Morally, we can't. It's semi-sapient."

That didn't make sense to me. As I saw it, it was the H'ohDaddi or us. If we spared it, *we'd* be the ones who'd end up semi-sapient—or worse.

Then he said, "If we kill it, we'll die too—from the enzymes its cells would release."

Well, that was different. Our only hope was to go down and try and get through the maw somehow.

As we started to go down the center stair, Dr. Brian-Scott said, "Look there." He was shining his light on a sort of niche on the far side of the room. It was a shelf as big as a bed and covered with cushiony H'ohDaddi. Along the wall and extending onto the niche were these grayish swellings. As we watched, they pulsed slightly. "It's the H'ohDaddi's nervous system," he said.

Well, it didn't do *my* nervous system much good to see that. The H'ohDaddi's brain was *big*. There were chains and chains of those

gray things creeping up the wall.

He stepped along the floor, watching out for the dark pink patches, and touched the H'ohDaddi brain; and he wanted me to touch it too!

It's hard to describe what H'ohDaddi brain is like, but it wasn't horrible like I thought it would be. It was interesting (if anything can be interesting when you are in the clutches of death) and it felt sort of like a jelly-bed covered in velvet.

I thought it behooved us not to stand around patting the brain, so we started down again. Not much light filtered down at all. It got darker and darker as we descended into the bowels of the H'ohDaddi.

We slipped and slid down, and the going got more hazardous. Nearly every place Dr. Brian-Scott shined his light showed those dark pink digestive patches. We could see ghost scuttle shells everywhere and little silver jelly-floats turning to puddles.

It was then that I really got scared. I could see us—nothing but bones—gristle for the H'ohDaddi's mill. To be consumed by a H'ohDaddi seemed to me to be the grisliest of fates, so I began to hurry.

When we reached the maw, I knew how Jonah must have felt. It was clamped completely shut. The H'ohDaddi's needle teeth were intermeshed in a giant **O.**

Dr. Brian-Scott tapped on the teeth and they clinked, but nothing moved. It is said that iron bars do not a prison make. Whoever wrote that didn't know about H'ohDaddi teeth. They were more like strainers than teeth actually. They're hinged to open inward when the tide comes in. Then they clamp shut when the H'ohDaddi is filled. The water strains out and leaves everything else inside for the digestive patches, which is interesting to note if you can be objective about your fate, but it isn't easy to be objective when you're what's been left inside.

All of a sudden we heard something. It was coming from outside very muffled and faint. "A–r–e y–o–u i–n t–h–e–r–e?"

Dr. Brian-Scott and I looked at each other, and then we both started hollering and yelling. My heart literally leaped for joy. We were going to be rescued.

Then the voice (I think it was the captain) said, "I–m l–e–a–v–i–n–g y–o–u a p–o–u–c–h."

Then he said something else, but we couldn't make it out, so we yelled, "What?"

And he said, "T–h–e t–i–d–e i–s c–o–m–i–n–g i–n."

Well, you talk about dashed hopes. We had to make a mad scram-

ble back up the tower to the control room so we wouldn't be drowned.

We barely got to the heart-brain room when a column of water came swooshing in that lifted us back up to the control room, and bobbing around with us was the waterproof pouch the captain had left outside the H'ohDaddi's maw.

After we got our breath, we opened it. There was some food and water inside, some tools, dry clothes, and a little radio. I fished the radio out, turned it on, and said, "H'ohDaddi to ship, this is Terra Tarkington. Do you read me?"

It crackled and hissed and then the ship answered with the awfulest news that I have ever heard.

They said (I still can't believe it) that they were waiting for us to rescue them. For *us* to rescue *them!* Can you imagine?

Hyades III is apparently the earthquake capital of the Bull Run. The reason the base of the Tower was flooding was because a quake sometime back had shunted the bay inland.

When the tide swept us up the tower, part of the noise we'd heard was the ship settling as a result of a minor quake. Now, the sensors indicated that a new quake—a big one—was going to strike in less than twenty earth-hours.

And the ship was disabled—stuck in a quagmire on the bay bottom. It was up to us to get the beacon working and send out a distress signal.

When he heard that, Dr. Brian-Scott said, "Well, Terra, I guess we're done for." And when he said that, he looked so defeated, so utterly hopeless that my inner organs throbbed in grief for him.

It was bad enough to be savaged and devoured by the H'ohDaddi, but now it looked like we were going to die. I couldn't bear to think of our beautiful relationship ending like this so I said, "We've got to try. Maybe we can peel the H'ohDaddi away from the window and jump out or something."

He brightened up at that. We pulled all the tools out of the pouch and set to work.

That was hours ago. And now I'm exhausted. Mr. Smith, you don't know what grim is until you've tried to peel a H'ohDaddi. You wouldn't *believe* how tenacious it is. About the time you think you've got a chunk loose, it sends out these sticky globs and glues itself back to the wall.

It was as if the H'ohDaddi had a mind of its own. On reflection, I suppose it has, being semi-sapient. Anyway, I have come to the conclusion that there is no way known to man to peel a H'ohDaddi that doesn't want to be peeled.

So now I'm sitting on the niche in the heart-brain room dictating this letter by radio to the ship's computer.

Before I shuffle off this mortal coil, it is my desire, Mr. Smith, that the Interstellar Nurses' Corps be sorry that they reduced me to this fate.

And it is my opinion that they would be sorriest if we sued the pants off of them, because only then would they see the error of their ways and cease and desist sacrificing poor innocent girls to the horrors of the Bull Run.

I have to go now, Mr. Smith. The tide is coming in.

Yours in extremis,

Terra Tarkington

Satellite Hospital Outpost
Taurus 14, North Horn
Nath Orbit, 978675644

June 9

Somtow P. Smith, Attorney at Law
Smith, Smith, Smith, and Wu
59 Embassy
Chattlanta, United Earth, Sol 094266741

Dear Mr. Smith:

Upon reconsideration, I have decide to spare the Interstellar Nurses' Corps from the full wrath of the law. After all, they mean well even though they are somewhat misguided; therefore, I am withdrawing my suit against them.

When the tide came in again, Dr. Brian-Scott and I huddled in the control room and contemplated our fate. The more we'd tried to peel the H'ohDaddi, the tighter it clung to the walls. It was the stubbornest creature I ever saw.

We were sunk in the depths of misery when, like a bolt out of the blue (to coin a phrase), I conceived my brilliant idea.

"If only we could distract it," I said, "take its mind off what we're doing."

When Dr. Brian-Scott heard that, he got a gleam in his eye, and he said, "Terra, you're brilliant." Then he leaped up and said, "Peel, Terra. Peel."

He simply *scrabbled* at the H'ohDaddi—the part that grew over the control panel. He was like a man possessed.

Well, I didn't see what the point was. We'd tried all that before and the H'ohDaddi simply wouldn't stay peeled.

"It doesn't have to, Terra. Except long enough for us to connect the current." And all the time he was talking, he was panting and tugging at the H'ohDaddi section and pulling it away from the panel.

I helped. We managed to keep it pulled loose long enough to connect a long electrical cable to the console and for Dr. Brian-Scott to set the controls. As soon as he did, the H'ohDaddi settled back on the console, with nothing but the cable sticking out.

I didn't understand it at all. I mean, did he plan to electrocute the H'ohDaddi? And what about the lethal enzymes the H'ohDaddi would give out?

"I've rigged a trickle charge, Terra. We aren't going to electrocute it at all. We're going to make it happy."

It was obvious to me that my poor beloved had finally become unhinged due to the strain. With a heavy heart, I realized that I would be spending my last hours with a madman who was bent on gratifying a H'ohDaddi.

We hauled the cable out to the middle of the room and then down the stairs—slipping and sliding all the way—to the heart-brain room.

Then he crawled up on the niche where the nervous system was and began to probe around with the cable wires. He kept muttering, "We've got to find it."

I was completely mystified. "Find what?"

"It's pleasure center. We *are* going to distract it, Terra."

It's an amazing thing, Mr. Smith, but when you stimulate the pleasure center of a H'ohDaddi, you know it. It leaves absolutely no doubt in your mind. One moment we were on our knees on the niche probing around the gray chains of nervous tissue and the next—Well, the whole niche was literally throbbing with delight—we could feel it.

We looked at each other and grinned. We couldn't help it. Then Dr. Brian-Scott said, "Come on, Terra."

We went back up to the control room. This time when we pulled the H'ohDaddi away from the panel, limp with pleasure as it was, it simply fell away.

Even so, it took a long time to reset the beacon and rig the distress signal to summon a rescue ship. It was *tiring,* Mr. Smith. So, when we were finished, it was perfectly natural for us to want a little rest.

Well, the obvious place was the niche in the heart-brain room, wasn't it? I mean it was wide and soft and a whole lot safer than

the rest of the H'ohDaddi.

Stretched out together there, it seemed to us that the H'ohDaddi was grateful. It seemed to be inviting us to share in its joy.

I can't express to you, Mr. Smith, how explicitly *blissful* a happy H'ohDaddi can be.

After a while, we felt a breeze and then we heard a voice bellow out from below, "A–r–e y–o–u i–n t–h–e–r–e? T–h–e m–a–w i–s o–p–e–n." Which goes to show how distracted the H'ohDaddi was.

So I said, "I guess we should escape now."

And Dr. Brian-Scott said, "I suppose so." And then he said, "When's the next high tide, Terra?"

"Not for two hours."

And then he said, "We've got plenty of time."

Well, goodness knows as debilitated as we were, we needed to rest before we crawled down out of the H'ohDaddi didn't we? I mean, it was only logical.

When we came out, my beloved was bursting with plans. First, he said he was going to write a paper for the Galactic Medical Journal entitled: "Artificial Stimulation of the Neurological Pleasure Center of the Hyadean H'ohDaddi and Its Effects on Contiguous Homo Sapiens."

By the time the rescue ship came in response to our distress signal, he had designed the plans for a special biological sleep center using a H'ohDaddi and a small power pack. He feels it has therapeutic value.

Sweet are the uses of adversity.

Therapeutically yours,

Terra Tarkington

A SPACESHIP BUILT OF STONE

by Lisa Tuttle **art: George Barr**

At this writing, the author is finishing her and George R. R. Martin's novel, Windhaven, *which will be coming out from Simon & Schuster and Pocket Books. One of her chief pleasures—after writing, reading, and buying books—is travel; she has just returned from an enjoyable month spent in Great Britain.*

I came upon a vast and ruined city in the desert. Long ago, huge building blocks had been hewn from rock, cut to fit together so tightly that mortar was unnecessary. It was a city not of straight lines, but of rounded corners and circular enclosures, walls towering twice a man's height. It seemed immense and harshly white against the blue sky and emptiness of the desert.

I entered by an arching gateway and walked through narrow, winding streets, touching the sun-baked stone with my hands. Here and there signs had been incised in the rock. I traced one with my finger: a cup-shaped maze with a stylized symbol, a rising bird, at the center.

The city must have been abandoned centuries before. Everything was open to the sky, all roofs long since rotted away. The sand had drifted in to cover the cobblestone streets. But the emptiness of the city, although it seemed sad, was not oppressive. I felt comfortable there, at home, as if I had returned to a place familiar since childhood. I patiently followed the curving lanes and entered each abandoned building in turn, looking for something.

At last I found it. There was a large, semi-circular enclosure at the very center of the city. Inside, a hole cut into the earth. Without hesitation, I lowered myself into it, my dangling feet finding purchase on a stairway carved into the rock. The stairs were steep, forcing me into a rapid descent. It was more a ladder than a staircase.

I climbed for what seemed a very long time, the darkness growing deeper around me as I descended. But just as I was wondering how long I could continue to climb down to an unknown destination in total darkness, a dim light from some source further down began to reach me; and when I reached the bottom at last, I could see perfectly well. I was in a small stone alcove. Behind me were the stairs to the surface; ahead of me, three branching tunnels. I chose the well-lit central tunnel. As I walked, I looked around at the curving, featureless walls and ceiling, which apparently gave off light. After I had walked for a long time, I began to hear a sound

ahead of me, a soft, irregular noise which I thought might be people talking.

At last I came to another branching, and an archway, which led into a room filled with people. They stopped talking when I entered, and looked at me with some apprehension.

They were familiar to me—I knew they were the people who had built the city above. They looked enough alike to be members of one family, with their unusual yellow-brown skin color, wide, round eyes, thin noses, and thick black hair.

A woman detached herself from the crowd and stepped forward, saying my name. Her eyes were intent upon my face; I had the idea that she knew me very well, was even perhaps in love with me.

"Rick!" she said. "You came back! Tell us, is it safe? Can we come out now? Will they let us live in peace?"

My earlier confusion dropped away. I had been here many times before, and knew these people well. They were not my own people; but I loved them and had agreed to help them. Why had I forgotten?

I opened my mouth to speak, to tell them that it was safe now, and I would help them settle above ground; and then the alarm went off.

Groggy and fumbling in the dark, I stopped it, then sat up, switched on the light, and reached for my cigarettes. I felt disoriented and confused. Unlike most of my dreams, this one had the force of reality, of some remembered event. Had I dreamed of those people and those underground tunnels before, or had my memory in the dream been nothing more than a dream of a dream?

I found notebook and pen and began to write down the details before they could slip away from me. I'd had bad luck with dreams, lately, waking every morning to find them gone, which was why I'd set my alarm to wake me up in the middle of the night. Describing the city in the desert, I wondered where I had seen it. I didn't usually dream about places I'd never been, and I wondered now if, perhaps, once as a child I had been taken to some stone ruins in a desert somewhere.

And the dream left me in an oddly vulnerable state. My last thoughts, as I settled down to sleep again, were that I would have to hurry back there, find the city again and the people who hid beneath it, and offer them my help.

But by morning I had nearly forgotten the dream—I remembered only waking and writing something down. I added the notebook to my stack of books and went outside to catch a university shuttle bus a little before noon. On the bus I saw a pretty, dark-haired girl

I'd noticed before, and sat down next to her. She was an art student—her sketchpad open on her knee. On the paper, growing beneath her pencil, was a familiar design: a cup-shaped maze with a stylized bird rising from the center.

I stared at the drawing, aware only that it was a familiar symbol, when suddenly, with shocking vividness—as if it were a memory of something real and not just a dream—I saw again the white stone wall with the very same design incised on it. I had traced it with my finger in my dream.

"What are you drawing?" I asked.

She looked up, seemed to recognize me from other bus-rides, and smiled. "This? I'm just doodling."

"But what is that design? Where is it from?"

She laughed. "It's from my head! I just made it up."

I was startled. "Are you sure? Couldn't you have seen it somewhere before?"

"Yes, I suppose." She frowned, then her face cleared. "I don't remember. But, anyway, it was in a dream I had last night." She laughed again, a warm, delighted chuckle. "Don't look so amazed! Don't you ever get ideas from dreams?"

"All the time," I said dryly. "In fact, that's the reason I asked you about that design. It was in my dream last night." I tapped the notebook in my lap. "I wrote it down here. I woke myself up at 3:30, on purpose to catch a dream—part of an experiment for a class I teach."

Her brown eyes were very wide—she seemed to accept what I said without question. "How strange," she murmured. "Three-thirty . . ." She looked down at her sketch-pad and began to drawn an elaborate frame around the maze design. "You see, I probably wouldn't have remembered this dream at all; but Bogey—that's my dog—decided he had to go outside, and woke me up at about 3:30. So while I was up, waiting to let him back in, I sat and doodled in my sketch-book while I thought about my dream." She lifted the spiral-bound pad and flipped back a few pages, holding out one for my inspection.

A line of stone blocks, a wall. The maze-with-bird pattern again. A stone gateway. And faces—faces that I recognized. The people from my dream.

I felt strange, my pulse speeded up. "Looks like my dream," I said quietly.

"I was in the desert somewhere," she said. "And there was this ancient city there, which was supposed to have been abandoned; but the people who had built it had actually fled below ground and were

hiding there. They were very gentle and peaceful and afraid that they would be killed if they came out. They were a wonderful people—I loved them, and was trying to help them. They kept asking me if it was really all right to come out, and I kept telling them that everyone would love them as I did. And then Bogey woke me."

I opened my notebook to the dream and handed it to her without a word. While she read I gazed past her, out the window at the sunny, familiar, neighborhood streets the bus was roaring through. The familiar had suddenly become strange, the strange familiar. The world was different—I couldn't tell if it were tinged with promise, or with menace.

"Telepathy," said a clear voice at my side.

I looked at her and shook my head. "But why? You and I don't even know each other—why should we be linked like that?"

She looked straight into my eyes. "Karma," she said. "We were meant to meet."

I laughed at her words, but I liked her look. I even liked the idea that we were somehow linked, that something had drawn us together, although it was a silly idea.

"A very scientific suggestion," I said, teasing her. "You want to have dinner with me tonight and talk about it some more?"

"Sure."

Through the window, I could see the tower lurching into view. I would have to get off at the next stop. "Meet me at Hansel and Gretel's at 6:30?" I suggested, gathering my books together.

She gave me another one of those high-voltage looks. "I'll be there."

It wasn't until I had gotten off the bus that I realized I didn't know her name.

But I didn't expect she would stand me up—not after such an opening. I walked up the grassy mall towards the building where I was teaching a workshop in journal writing. Most graduate assistants get saddled with the dullest of introductory courses, and I considered myself lucky this semester to have gotten something a little out of the ordinary—no matter that I thought it a self-indulgent and unnecessary course.

I paused on the steps outside to smoke a cigarette. I was really trying to get my mind on the class I had to teach, when all I wanted to think about was the dream—my dream, her dream—and what it meant. When I finally went inside, and down to the large, blank-walled basement classroom where we met, my class of ten had assembled.

I perched, as usual, on the old wooden desk at the front of the room, and looked at them. "Any of you have trouble catching a dream?" I asked.

Of the ten, it turned out, only five had dreams to report. One had slept through the alarm, another had simply forgotten the assignment; the other three were the most chagrined, however. They had ignored my suggestion of setting alarms for the middle of the night as unnecessary—they claimed to dream vividly and to remember what they had dreamed. But this morning had been unusual. They had remembered no dreams.

I nodded thoughtfully, feeling myself slip into the psychiatrist role this class seemed to reserve for me.

"Perhaps," I suggested, enjoying myself, "you dreamed of things you would be too embarrassed to discuss before the whole class? So your unconscious thoughtfully censored them from your conscious? Well, try again tonight. We'll just move on to some of the dreams which were recalled. Anyone like to start by reading his or her dream?"

Eve Johnson flicked one impeccably manicured hand in the air and, at my nod, began to speak, referring only occasionally to her notebook.

"The dream began at a frat-party, which was pretty dull. But then some friends of mine started talking about driving to California, right then. This actually happened to me once—some friends decided to drive to California on the spur of the moment. Anyway, in the dream, all of a sudden it switched to us on the road, travelling through the desert someplace like New Mexico. We got off the highway onto a dirt road for some reason and drove through all this emptiness for awhile. Then, all of a sudden, right in front of us was this huge, stone city. It was built of big white stones, and we could see it clearly in the moonlight. But it was abandoned—and I found myself remembering, as I looked at it, that the people who had built it had been afraid that the government or somebody would kill them, so they had gone into hiding underground. Then—what's wrong?"

Only then did I realize that I had gotten off the desk and walked towards her.

"Uh, could I see the notebook, please?"

Eyebrows raised, she put the notebook into my hand. My eyes ran down the lines of neat, even handwriting, reading about her discovery of the tunnels, and meeting with the people who lived beneath the city-ruin.

I looked around at the others, some of whom looked puzzled, others

of whom looked oddly excited. I said, "Something strange has happened. This dream of Eve's is remarkably similar to the dream *I* had last night. . . ."

"Me too!"

"I dreamed the same thing!"

Pat Haggard and Bill Donaldson had spoken almost simultaneously. Now they looked from me to each other, their expressions mixtures of wonder, curiosity and suspicion.

"Anyone else?" I asked. I realized I was probably grinning foolishly. "Did anyone else have a dream with the same elements—the abandoned stone city in the desert, the tunnels underground, the people there afraid to come up?"

Slowly, Mary Crouch raised her hand."I dreamed something like that, I think," she said. "I can't remember much about it. Just that I had been talking to these wonderful people, some sort of advanced, peaceful tribe, who seemed to live near some huge stone ruins."

I nodded slowly. "Bill, Pat . . . would each of you please read your dream reports?"

All the elements were there; all the inexplicable similarities. The same dream, dreamed by six different people. At least.

We spent the rest of class-time talking about the dreams and what this bizarre coincidence could mean. We discussed telepathy and precognition—one of the liveliest, most exciting, most wonder-filled classroom discussions I'd ever imagined. But of course we proved nothing and came up with no real answers. When the bell rang we were all frustratingly aware of how little we knew. My students all promised to continue recording their dreams and eagerly offered to do any other research I might suggest.

When they all left, I walked across campus to the library to start the research. I had decided first of all to try to find out if the place we had all been dreaming of had any objective reality.

I paged through volumes of anthropology, archeology and travel, but did not find the city I thought I knew in Anatolian ruins, nor in Greece, nor Peru, nor in the monolithic structures on Malta, nor in the Arabian desert. Because two dreamers had mentioned New Mexico, I turned next to books about the Southwest. There I found the stone and baked-earth structures of the Pueblo Indians, the hogans of the Navajo, and the legends of the Seven Cities of Cibola. The Pueblos believed their ancestors entered the present world from a hole in the ground, climbing up from a world below. I took notes, but I found no answers.

§ § §

She was waiting at the restaurant when I arrived, even prettier and taller than I'd remembered, looking like a 1940s film star in a vintage black dress and lots of cheerfully fake diamonds, spike heels, and an upswept hairdo.

"I've got so much to tell you," she said at once, rushing to meet me.

I took her hand. "How about your name?"

We both laughed.

"I'm Judy Anderson."

"Rick Karp."

We shook hands, and that made us laugh again.

"You look great," I said. "I'm such a slob . . . I knew I should have rented a tux."

"No, no, that shirt is lovely." She reached out to pluck at the fabric. "In fact, I have one just like it at home, only the azaleas on it are a little smaller, and a brighter pink."

"It faded some between Hawaii and here," I said.

We took a booth near the back and I ordered a pitcher of dark beer and a plate of cheese and bread to start.

Judy leaned across the table. "In my design class this morning we were told to create a symbol for a made-up company. A pictograph, right? And one of the women in class drew a picture of a maze with a bird rising from the center, for a company she called 'Anasazi Airlines'."

I frowned in surprised recognition.

"So I asked her where she got the idea, and she said it had just come to her. Then the teacher overheard us and said, in his usual supercilious way, 'Give credit where credit is due, please. The Anasazi Indians came up with that design more than a thousand years ago.' "

"The Anasazi Indians," I said, remembering what I had read about them that afternoon. "They were the ancestors of the present pueblo-dwelling Indians—the Hopis, the Zunis, the Pueblos. The Anasazi culture spread all across the Southwest. The word 'Anasazi' is Navajo, meaning 'ancient ones.' "

She pouted. "And I thought I'd surprise you by doing a lot of research! But you know, I went through practically the whole art library and couldn't find that bird-in-the-maze design. I figured if my teacher knew about it, it must be pretty common. Were we dreaming about the Anasazi, then?"

"Courtesy of the Anasazi Broadcasting Company?" I told her about what had happened in class that day and watched her eyes grow

larger. I patted her hand. "So you see, it wasn't karma bringing us together, after all."

"Maybe it's *your* dream, and you're sending it to receptive people?"

I shook my head. "It sure doesn't feel like 'my' dream. But even if that explained the people in my class—why would you have picked it up?"

She looked at me through her lashes. "Maybe I noticed you on the bus before . . . maybe I was thinking about you . . . maybe I'm just very receptive to your thoughts."

I grinned. "And the woman in your design class?"

"Oh. Coincidence."

"I think coincidence is one thing it's *not*. There's something going on—"

"Rick. Maybe *everyone* had the dream. And only a few people remembered it—the people who woke up in the middle of it, like you and me."

For some reason that idea made my skin prickle. "We have no evidence for that."

"No, and if they've been made to forget it, we never will have."

I was silent, wild thoughts of a nation-wide—world-wide—survey on dreams racing through my head. "But what would that mean?" I asked. "Assuming that were true—*why* would everyone have the same dream? Is someone sending it? Why? And if there is some reason for everyone to dream the same thing—why would the majority forget it? What could that accomplish?"

"People are influenced by things they can't remember consciously," Judy reminded me.

"Yes, but . . . *why*? No, that world-wide theory doesn't make sense. It's more reasonable to assume that you and I and the woman in your design class and the people in my class are members of a group who are somehow telepathically linked, or receptive to . . . oh, each other, or one particular person. And this has happened before, and will surely happen again."

Judy grinned at me. "I try to tell you *we're* linked, and you sneer at me. Your theory is just karma under another name."

We talked of little else during dinner—our speculation ranged and soared—but there was more going on beneath the talk. She went home with me that night.

During the next two weeks Judy and I and the people in my class all kept dream-notebooks. But there were no further "coincidences"—all the dreams were idiosyncratic, personal, individual dreams. I began working on a report to send to the Maimonides

dream laboratory in New York. Judy and I spent more and more time together.

One night, Judy and I lay cozily together in my bed, paying little attention to the newscast carried on the little black and white set at the foot of the bed, when something alerted us.

Judy half sat up. "What was that—"

One word caught us from the televised babble: "Anasazi."

A well-dressed reporter was standing in a windy desert with a man dressed in grimy jeans and a pith helmet. The camera panned back to reveal an excavation in progress.

"And who, exactly, were the Anasazi?" said the reporter.

The other man, identified in a title across the screen as **Dr. Reuben Collier, UCLA**, wiped his brow. "They were the precursors of today's Pueblo, Hopi, and Zuni tribes. We had never imagined that we would find anything as complex as this. We have right here in New Mexico uncovered an amazingly large, well-designed city built of stone and adobe. Many of the buildings are constructed with connecting underground tunnels. Hacking out those tunnels must have been a prodigious feat in itself. I'd say this rivals almost anything in the ancient world."

"Astonishing," said the reporter. "But you say this was unexpected? No one had any idea this city was here?"

"We didn't realize the Anasazi culture had ever attained such a height," the archeologist said. "Of course, this find raises the new question of what happened to that culture, how it fell. But by calling this the work of the 'Anasazi,' we are simplifying, you realize—"

"How did you find this site, Dr. Collier?"

He grimaced. "Most unscientifically, I'm afraid. I had a grant to do work in this area, of course, and was working on aerial photographs for some indications of what lay below the surface. But why we picked this particular spot to dig—well, quite truthfully, it came to me in a dream."

"Many archeologists dream of great finds; Reuben Collier's dream came true," said the reporter, turning his handsome visage back to the camera. "Steve Carpenter reporting."

My chest was tight. I realized I hadn't been breathing, and let out my breath with a sigh.

"Well, so that's it," Judy said. "*He* was the one the message was for." She sounded remarkably satisfied.

I stared at her. "What are you talking about?"

"The dreams. They didn't mean anything to us—but they did to him."

"Well, yes, but so what? What are you saying?"

"That getting someone to dig up the city was the *point* of the dream."

"And who was it who wanted that particular task done, may I ask? A bunch of dead Indians?"

She chewed her lower lip. "Well, I don't know. But now that the city has been discovered, the dreams seem to make a little more sense, don't they?"

"Not at all," I said. I was thinking about getting in touch with Collier and wondering if anyone else who'd had the dream might have seen him on television and decide to do the same.

"Look," said Judy. "If the dream had a *point*—if it was supposed to have an effect on someone—that could be it. Maybe it was beamed out; and a lot of people picked up on it, like us; but only a few would be in any position to do anything about it—like that anthropologist. The dream meant something to him, and he could do something about it."

I shook my head, annoyed because what she seemed to think was an answer was no answer at all. "Where did the dreams come from? *Who* beamed them out? Who could possibly want that city discovered yet have no way of ensuring that discovery except by giving people dreams?"

"Well *I* don't know," she said, sounding aggrieved. "I didn't ever say I had the answer—I was just making a suggestion."

So then, of course, I had to kiss her and tell her that her suggestion was a good one—as good as any other. And it probably was—but it still didn't make sense.

The discovery in the New Mexico desert had to be the biggest archeological find of all time. It caused more excitement than King Tut's tomb ever had, and suddenly the whole country was Anasazi-crazy. Everywhere you looked there were the headlines, the magazine articles and books, television specials, and commercials. Stores carried Anasazi toys, games, and postcards. One day Judy showed up in a sundress covered with the bird-in-a-maze design.

It was a flood, a bombardment. Everyone knew about and talked about the Anasazi. We all dreamed about them. It would have been odd, given the sea of information we all swam in, *not* to have dreamed about them. In the dreams—in my dreams and Judy's, at any rate—the Anasazi were always the gentle, wise, and peaceful people of that first dream, only emerged now from their tunnels. Even that original dream, shared by an unknown number, no longer

seemed so odd to me. We were all so obsessed with the Anasazi now that it was as if the force of the present had been pressing against our unconscious minds then, demanding to be recognized: the Anasazi knocking to be let in, calling with ghostly voices for remembrance.

I had a recurring vision, during this time, of a crowd of the Anasazi emerging from the earth. They climbed up narrow stone steps and emerged from the tunnels into the open air, one by one, in starlight and daylight, unending. One by one they come, the line behind them going back forever, and each, to my foreign eyes, looks like the other. Their faces are watchful, thankful, wary. Are we home yet? they seem to ask. Will we be safe here?

Not exactly a dream—not at all like my other dreams about the Anasazi—but just a fleeting thought, an image that recurred to me, disturbing me.

Because the Anasazi *had* suddenly emerged; had come out when no one was looking. And everyone—except me—seemed content to believe their eyes instead of their memories and accept the common knowledge that they had always been among us.

I saw them everywhere. A woman with that distinctively Anasazi face would be sitting quietly on a city bus, or pushing a cart through a grocery store. I would see an Anasazi man, holding two small Anasazi children by their hands, crossing at the light. Faces in crowds, on the evening news, passing in cars. They had arrived quietly, without fuss, and integrated themselves into society as if they had always been here.

Even to myself this seemed an odd obsession—where, then, had they come from if they had not always been among us?—and so I tried not to think about it, and did not discuss it. I was under a lot of strain, trying to get my dissertation written and adjusting to life with Judy—at the beginning of the summer we took a house together, and talked of marriage "eventually."

At the end of the summer I emerged from my stupor of research and writing to discover that the Anasazi had united to ask for their city (baptised, naturally, "Cibola," months before) and surrounding lands to be turned over to them. They asked to reclaim their homeland.

Indian groups had asked for Florida and New York, as well as other chunks of property, before, so there was nothing so unusual in the request. What *was* unusual was the response. Sentiment ran high in favor of giving the Indians their home back. Senators and representatives spoke in favor of it. Even the president . . .

It all seemed to happen with amazing speed as we read about it in the papers and watched it on our television screen. One hot day in September Judy and I were ensconced in the bedroom, the window-unit laboring mightily to cool the air, eating Chinese food from cardboard cartons and paying feeble attention to the images flickering across the screen at the foot of the bed when the president made his special appearance and deeded Cibola and surrounding lands to the Anasazi tribe. Just like that.

Judy gave a small cheer. I sat up, set my carton of food aside, and turned off the set.

"What's wrong?" she asked.

"Where did the Anasazi come from?" I asked. "Who are they? Two years ago, nobody but professors and archeologists had heard of them. Now they suddenly have not only a history, but a present and a future—and their own homeland."

She stared at me. "I thought you agreed that the Indians—"

I held up one hand, cutting her off. "I'm not talking about the Indians. I'm talking about . . . these people, who are called Anasazi. Where did they come from all of a sudden? Remember the research we did? The Anasazi culture died out long ago—their descendents are called the Pueblo, Zuni, and Hopi. Nowhere in any of those books was there a mention of a modern-day Anasazi tribe—yet there are suddenly thousands of them!"

"Oh, *books,*" she said, with fine scorn. "What are you going to believe, Rick—what some old book tells you, or what you *know,* what your senses tell you?"

"What *do* I know? I know that since the dreams, and the discovery of Cibola, I've seen the Anasazi, and read about them, everywhere. Not before then—before, they weren't here."

"Of course they were here! We just weren't aware of them!"

"That's what they want us to think," I said. I paused, steeling myself to say aloud what I felt. It was a crazy idea—I knew that as well as anyone—but it haunted me nevertheless, unforgettable as a recurring dream; and I was tired of keeping it to myself.

"All right," I said after a few moments. "I'm not asking you to believe this, just to listen and consider it. Suppose that somewhere, maybe on another planet, was a race of beings who either looked like us, or could alter themselves to look like us. And something happens, maybe their planet is about to be destroyed, and they need a new place to live. A planet like this one." Plots of many old movies, comic books, and paperbacks avidly consumed in adolescence raced through my mind. "But they aren't aggressive—they're a peaceful

people, unwilling to hurt or frighten the primitive earth-people. All they need, after all, is a base, room for a colony of maybe fifty or a hundred thousand people.

"They could be quite advanced, although they don't use their technology for war. They send advance propaganda in the form of dreams, so that we meet our new neighbors at night, in the most intimate circumstances, and absorb the lessons with no conscious memory later. Everyone loves them, without knowing why. Everyone is accustomed to the idea of them, sure they've always been around when they finally arrive, accepting them as the indigenous people whose name they use."

"You're saying that the Anasazi came here from outer space in UFOs?" Judy asked blandly.

"Maybe not in the way our popular culture has prepared us for," I said. "Instead of arriving here in bright silver ships with flashing lights, they came in the back way, climbing out of a hole in the ground. They stepped through some interdimensional doorway, bringing their city of underground tunnels and above-ground structures—they came in their spaceship made of stone, and no one noticed."

"Except you," said Judy. "Oh, Rick." Her face was distressed; she looked as if she was going to cry.

"You think I'm crazy," I said. "Just because I wonder where the Anasazi really came from."

"If I woke up some morning and began asking you, in a very worried way, where all those brown-skinned people with Spanish surnames came from all of a sudden, and wouldn't believe you when you told me that they hadn't suddenly invaded us, but had been around all the time—you'd think I was paranoid, wouldn't you?"

"I'd think you were putting me on," I said. I shrugged. "I don't begrudge them their desert city—they built it, after all, and nobody was using that land. But I don't like thinking that they've tampered with our memories, made us love them. Even while I'm saying this, Judy, part of me is protesting that this is crazy talk—that I *know* who the Anasazi are, as well as anyone! And I can't help feeling warmth for them. But I also know what I've read, and I think it's very suspicious that nothing written before the discovery of Cibola refers to Anasazi as if it were anything more than the name of a long-vanished culture. There is no reference to a present-day tribe by that name. It's as if . . . when the Hittite civilization was rediscovered by the archeologists and historians, suddenly a group of people had appeared, calling themselves the Hittites, saying they

had been there all along, despite any references to them in any book or—"

"Rick," said Judy, looking at me with tender sadness. "Oh, Rick, and you think *my* theories are crazy!"

"It's not a theory," I said. "It's just a story." I was annoyed, at myself and at her. I didn't want to convert her, or even convince myself. I wanted to reconcile the two kinds of "knowledge" I had about the Anasazi. I wanted to understand what had happened. "I didn't want to be right—but I didn't want to be crazy, either.

"You think too much about books," Judy said. "After all the work you've done on your dissertation, it's no wonder. But plenty of things are real which aren't in books. I'm not in any book, and neither are you—except the phone book—and we're both real."

I didn't argue anymore. I didn't want to. We smoked and talked about other things. I didn't forget my uneasiness about the Anasazi, but I tried not to torment myself about it, either—there didn't seem to be anything I could do to prove my fantasy had any foundation.

Two years later, we went to Cibola on our honeymoon.

Odd, to see a dream made solid.

This Cibola was different, of course. It had been fixed up, repaired, and inhabited. There were domed roofs on the round stone structures now, wooden doors, flowers and herbs growing in window-boxes.

The stones were still brilliantly white against the blue sky, just as they had been in my dream; but as we wandered through the maze of cobbled streets the smells of people, animals, and frying food, and the sounds of tourists and Anasazi bartering over jewelry and woven blankets added the hard, undreamlike edge that was reality.

I reached out to touch the dressed stone blocks, so carefully fitted together. My fingers encountered the smoothly incised lines of a maze-design, and I traced it with a finger—again? or for the first time?

There was a guide, pointing out sights of interest and explaining Anasazi customs. He led us with unerring instinct to the shops and stalls where Judy was most likely to buy. While she was comparing the merits of two silver bracelets I asked the guide about the tunnels.

"Tunnels?"

"Yes, when Cibola was discovered I remember it was mentioned that underground tunnels connected the buildings."

"Ah." His face told me nothing. "There isn't much to see. But of course it will be out of the sun, and perhaps you would like that?"

He led us off in a new direction.

But this tunnel was nothing like the cool, wide, well-lit artery of my dream. It was narrow and dark, and we had to crouch slightly as we travelled along. My back soon began to hurt. After a few minutes of unrewarding exploration we climbed up a short wooden ladder and emerged in a candle-shop.

"Is that all?" I asked. "What about the other tunnels?"

"There are more," he nodded. "Cramped little passageways leading from one house to another—perhaps twenty of them in all, and none of them any bigger or longer than the one I just showed you."

I could feel Judy's eyes on me, and knew that she knew what I was thinking. I persisted, "Bigger tunnels," I said. "Wider, deeper below ground, well-lit. Underground chambers."

"Nothing like that here," he said, shaking his head.

I was suddenly impatient with him. "And if there were, and you didn't want us to see them, you'd say the same thing. Why do we need a guide at all here? What are you protecting?"

Judy took my arm. "Rick . . . "

"You are a guest here," the guide said, very quietly. "You must obey our rules, or leave. This is a reservation, which is to say a separate country."

"An alien outpost," I said. I was sweating, suddenly aware of how hot it was. "And we gave it to you. We accepted you, and gave you a place to live, just as you wanted. And it's too late to change our minds now. Come on, Judy, we're going."

It wasn't the greatest honeymoon in history. Judy's initial anger over my making a fool of myself and spoiling the trip soon turned to concern for my mental health when I began expressing the opinion that I would not be allowed to live very much longer, now that I had revealed my suspicions of the Anasazi.

But, of course, nothing happened. And eventually, to Judy's relief, I stopped talking about my paranoid fantasies. They might be true, or they might be crazy—but in either case, they didn't do me, or anyone else, any good.

And so, for almost three years, I had no reason to remember my doubts. Until very recently.

Bogey woke us up in the middle of the night about two weeks ago, desperate to go outside. Judy went back to sleep after a sleepy argument over whose responsibility the dog was; and I got up to take him out, musing meanwhile on the dream he had interrupted. It had been an odd and vivid dream—and it reminded me of something I could not quite catch hold of. While waiting for Bogey to be

ready to come back inside, I picked up one of Judy's sketchpads, and a pen, and began jotting down notes of what I remembered.

I was in the jungle, a tropical rain forest on the side of a mountain. I began to notice a faint trail that told me someone else had been here before me and, at the same time, became aware of an odd, soft, whispering sound. I stopped still and looked around carefully, and then I saw them.

People, their faces shy and frightened, peeking at me from hiding places among the trees and underbrush. I knew that it would require a great deal of care and patience on my part to get them to come out. And I wanted them to—I wanted them to trust me. I felt an overwhelming surge of affection for these people I could barely see—the urge to protect them, to offer them safety and shelter. As I tried to think how to let them know this, Bogey's cold, insistent nose in my ear woke me.

As I sat there, sleepily staring at what I had written, I suddenly knew what this dream reminded me of. Another dream. I hurried back to the bedroom and woke Judy.

"Judy," I said urgently, trying to break through her sleepy incomprehension. "What were you dreaming? Quick, tell me."

"Hmm? Tell them . . . tell them we love them. They're safe."

She was dropping off again. I shook her. "Judy! Please! Wake up."

She opened her eyes and sat up. "What's wrong?"

"What were you dreaming?"

"Huh?" She rubbed her eyes and yawned. "I don't know . . . something. I was in the forest. With friends. I don't know, What's the matter, honey?"

"Go back to sleep," I said. "I'll let Bogey back inside. We'll talk in the morning."

She made a face and grumbled at me, but was asleep again almost as soon as her head hit the pillow.

Since then, I have been waiting for the other shoe to drop. And today my waiting ended. It wasn't on the evening news. It was just a story on an inside page of the paper—so many other important things happened today, it seems. A report from the Philippines on the discovery of a group of people who may be a tribe previously unknown to civilization, living in mountain caves in an almost inaccessible rain forest A shy and gentle people, who only want to live in peace. I know just what they look like.

HOT PURSUIT

by John M. Ford

art: Alex Schomburg


GCWR
SCHOMBURG

But then, Dr. Asimov is to some degree implicated in this series of stories around the Tower, since it was his Foundation series that inspired the article that inspired the extra color painting that . . . and so on to, in this case, a wholly serious treatment of the scene.

The Gilgamesh Center for Worlds Research thrust up from ice and lichen, rising from the polepack as if sprung fully grown from the mind of the world. Its legs stood wide and bored deep; its arms stretched broad, probing air thick, thin, and near-Void. The highest stories of its highest stack were sealed like a ship, pressurized.

Between that peak and the polestars a ship flipped from Diov into Void and descended to the Center. It was like a hundred thousand other ships in form, but where those others were banded with color according to their services this one was spotless white. It sent no signal except that it had arrived, asked no permission to approach. Clearance was made for it. The other vessels flying gave it more than adequate room. The ship lit on a lateral arm of the Center nine hundred meters above the ice, docked and locked.

Warden Jin Tan Aashe stepped from the lock. He was muscular, not tall; dressed in high-collared, hooded tunic, loose trousers, and boots, all white. On a steel-mesh belt were sonde, door pass, a small weapon with a flared barrel.

Tan Aashe's skin was dark and smooth and hairless. His face was quite flat, and his eyes were like chips of tigereye stone polished smooth.

He was met by a functionary and three subfunctionaries who inquired as to his immediate desires.

"Only to see your background tapes," Tan Aashe said, before they could suggest alternatives. His voice was strong but neutral, uninflected. They hastened to obey.

It is not that the Wardens of the Worlds disdain to answer calls; but one does not call them lightly. Not even Center.

Per Hel Covys was a Coordinator, meant to rove Center's nine stacks and hundreds of levels, preserving the delicate lines of communication between Center's thousands of research workers in every field. His door pass was unlimited. He could even enter the supersafe rooms where ARGENT 7 was being refined and tested, with-

out Center's internal security systems taking particular notice.

They noticed, however, when Hel Covys sonicked the radiobiochemists in the ARGENT lab. And they noticed when he rolled his sleeve, strapped his arm, and injected six cc of ARGENT 7 into his bloodstream. There was simply very little the secsys could do about it.

They tried to close doors and stop elevators before him, but Hel Covys' door pass had the power to override that. They tried to knock him down with sonics, but a device in his wide-brimmed hat shrugged the waves off. Then (the secsys not angry, but with a heightened sense of purpose) the bright blue light of an ultralaser made the air ring two octaves above middle c, to sever Hel Covys' left foot at the ankle and stop him certainly—but his red-and-black cape shifted his image on the seeker screens and no hit was registered.

Hel Covys was out the door and running then, his cape fluttering, his breath coming in white clouds. The secsys (not angry still, but determined) sent a signal to its depth-belt defense: one hundred seventy single-shot ultralasers that would tessellate the space of Hel Covys' passage—and tessellate Hel Covys, regardless of his precise position.

As the killing code raced down a waveguide, Per Hel Covys stopped in the center of the depth-belt, feet apart, arms raised, cape snapping.

The secsys caught a white gleam in the Coordinator's eyes. Then lines of blue-burning light webbed the field. The camera lens stopped shut to preserve its sight.

When it opened again, Hel Covys stood untouched in the midst of streak-scorched pavement and grooved ice. The whiteness left his eyes. Then he turned and ran on. The lens cranked out, following him to the airpad a few hundred meters away.

Hel Covys took an airboat, lifted and flew. The secsys tracked on from a skyeye, until after two hours and several hundreds of kilometers, just as chase boats were coming together, ARGENT 7 entered the Coordinator's autonomic nerves and he ceased to appear on all scopes, all screens.

The tape beeped, ended. Jin Tan Aashe sat straight and still.

"The beams did not pass through him."

"No, Warden. None of the lasers that would have struck Cordin Hel Covys fired. Their storage cells . . . refused to discharge."

"Were the malfunctions localized or separated?"

"Widely separated. The depth-belt is constructed in an essentially random fashion."

Tan Aashe nodded slightly. He stood, closed his eyes for a moment. "It's eleven-fifty. Twenty-four hours since Hel Covys left. There is sound reason to believe he hasn't left the planet?"

"Yes. If he flipped into Diov, we'd pick him up on space-strain gauges. ARGENT could not conceal the aftereffects of that."

Tan Aashe nodded again. "Then is there another dose of ARGENT 7, proportional to the one Hel Covys took, available now?"

"For *you*, Warden?"

Another nod.

One of the radiobiochemists, a plastic collar supporting his sonicked head, said: "Yes . . . but . . . there are side effects."

"How severe?"

"Lul-lethal. ARGENT 7 kills in fifty to one hundred hours. It's huh-hemolysis," the chemist said, almost apologetically. "The blood breaks down . . . we haven't been able to beat it."

"Any antidote? Cure?"

"Perfusion. Tuh-total blood replacement."

"And did Hel Covys know this?"

"He could have. He might not. With a Co-co-ord—who knows?"

Tan Aashe looked at his left wrist. He unfastened the cuff and pushed back his sleeve. "I assume you have adequate supplies of syntheme and blood in common types."

There were mumbled protests.

Tan Aashe said, "Since if you do nothing Hel Covys will shortly be dead, I assume that you called me because you want him returned alive. Is that not so?"

The Center Chief Coordinator, dressed in a brown gown, looked up sharply. "Absolutely, Warden. Per Hel Covys was—" But she did not finish the thought, nor did anyone else offer to.

"Then I have to bring him in on his terms, whatever ARGENT 7 may have made those to be. Please prepare the dose at once."

Aboard the Warden's ship was a Type V battle dress that could make Tan Aashe as strong and fast and destructive as a medium-armored vehicle or a one-man starfighter, invincible by ordinary men. But the T5 was nuclear-electric all round, controlled by semiconductor circuits. With ARGENT 7 in his blood and brain Per Hel Covys naked could defeat Tan Aashe in the armor.

But a Warden's armory is large and varied. Tan Aashe locked a medium manpower to himself—rods along his limbs, joints close to

his. It was powered by colloids and fluidics, not electrons. Over the manpower went spaced-plate plastic armor, a neck-and-skull helmet, alloy-claw gauntlets.

Entirely too many of his ranged weapons were ultralaser or, worse, plasma types. He decided on a pouch of plain beryllium ball-bearings and—for other targets—a two-shot pocket laser with a mechanical safety.

Tan Aashe looked down at his large hands, then went into the lavatory and examined his face in a mirror. There was no visible change. He put two fingers to his forehead; there seemed to be a slight warming.

He thought at the ship's chronometer, trying to hold its single sweep hand back. He could feel something, then, inside his head, heard a faint clicking; and for one second the clock hand paused above the digits.

Then it ran on, and its stoppage might have been an illusion—but a tiny red lamp lit, indicating that the chronometer was out of sync and now reconciling itself with the master pulsar signal.

One second on a clock, when Hel Covys had stopped a dozen lasers. A Warden's body defended itself against drugs; ARGENT 7 would take its time with Tan Aashe. It might also, then, take its time about killing him.

Tan Aashe went to the waist of his ship, where a small airboat was berthed. With his manpower on 1-x amp, he slid into the pilot's couch, opened the bay doors, and glided out, silent on the swift polar air. Behind him, from the pressurized levels, a beacon burned: the secsys, watching.

Tan Aashe's hands rested lightly on the airboat's control pads. His claws were folded back against the backs of his wrists. A diaphragm pumped fresh air through his armor. He was perspiring slightly.

ARGENT 7 was all through his blood and had entered his nerves. When he looked at an instrument, its face would be filled with light, the markings and traces showing in high relief. On the ground, landmarks stood out at a glance. Odd shifting moires in the air exactly matched the patterns of air turbulence on the boat's radar.

And the engines did not sing plainchant, but spoke direct and clear: fuel injection was off slightly to portside; the venturi was worn a little wide. Tan Aashe reached for the trim toggle. Before his fingers reached it, it moved. Before he could check the gauges, his ears and the thrum of his seat told him the engines were rebalanced.

He alternated looking at the instruments and the morning sky, then shifted between groundmarks and airflow patterns. ARGENT 7 broke down its sensing structures of silver and silicates, reformed them into new ones, and wired them into Tan Aashe's body, all in parts of a second.

While he watched the ground, the boat struck clear air turbulence, bounced and rolled. Tan Aashe hit the pads, trimmed and tilted, leveled off—and realized his hands were still at his sides.

He carefully lifted his feet from the pedals, and satisfied himself that he could fly entirely by ARGENT, by metamicrowire. He wondered how expert a pilot Hel Covys was, whether he could fly by instinct, in his ARGENT sleep.

His sonde whistled. "Warden, this is Center. Are you receiving?"

"Tan Aashe receiving, responding," he said, conscious of a change in his voice. As he spoke the sonde crackled and dropped out.

"Warden, skyscan . . . cated the Coor . . . boat. It . . . appeared on the screens . . . nutes ago."

"Crashed?"

"Ah . . . yes . . . skyeye indicates. How did . . . grid locations follow."

"Don't send them to the tracker. Read them to me. I say again, read them off. And repeat."

Pause. "Linx 140.8, zeni 28.3 . . . eight hundred . . . of you. . . . ping out bad . . . 40.8 . . ."

"Boost your sonde signal. Boost now."

"Not just sonde . . . screens, skyeye, Warden, you're . . . just like . . ."

Then there was nothing. Tan Aashe changed channels without effect. He looked at his compass; the arrow and digits were spinning freely.

If he focused his attention on some other task, he might be able to keep ARGENT from masking him.

Suppose he could make an electrohemodialyzer—a static filter to separate ARGENT from his vulnerable blood?

No. Not even if he did it brute-force, picking ARGENT molecules from heme groups one by one. How could ARGENT function in him *and* stand apart? He could not see the back of his head by plucking out his eyes.

And—his mind, even his unconscious mind, controlled ARGENT. He thought he knew why he had made himself disappear, and did not try to cancel it.

Alone, as Wardens work, Tan Aashe turned his boat with ARGENT

instead of hands and sent ARGENT instead of radar sweeping for the bit of wreckage ahead. His hands, in his lap, were pale, warm. They had a silvery sheen, more metallic than sweat.

When he found the broken boat it was 08:16:37, twenty hours since he had taken ARGENT 7, forty-five since Per Hel Covys had. Wardens were taught timekenning in their first year of training. But it seemed now as though Tan Aashe felt the tick of the pulsar directly, that he was more true than the chronometer in his ship.

The morning sun flared in his eyes. He reached for the sunshield lever; the glare dissipated before he touched it.

The sunshield had not lowered. Ahead, one single cloud hung in an empty sky, blocking the sun.

Tan Aashe desired warming light, and the cloud broke up. His eyes were stabbed, and it reformed.

He put his hands on the controls and landed the airboat with muscles and motors. His fingernails gleamed like burnished steel.

Hel Covys' boat had come in at a nearly vertical angle. It should have been a layered wafer of metal with a man for filling. But it was only cracked open down the side; the nose was shallowly buried in moss and dirt.

It was empty. There was no trace of blood, though a piece of Hel Covys' cloth-and-circuit cape was snagged on the metal. Some of the instruments had cracked and blackened faces. The crash web had been triggered; it hung in tatters around the unhinged pilot's seat, charred fabric over metal filaments with molten ends.

The split in the boat's side, Tan Aashe observed, had been made from within. From it, deep footprints led through the moss into a dark green grove of conical trees, toward a granite cliff.

The Warden fixed the faceplate to his helmet; it was smooth, blank, with a dark quartz vision slot. He folded the alloy claws over his hands. He thought on ultraviolet frequencies, and ARGENT 7 built microreceptors behind his retinas. The trail stood out plain as if painted. He started walking toward the cliff.

At the cliff base the clear trail ended. There were disturbed stones on the rock face, cracks and grooves that to a good rock climber—or a poor ARGENT one—would be as easy as stairs. Tan Aashe expanded his vision, extended his hearing, and did not forget that Hel Covys had taken ARGENT 7 wholly into himself, while Tan Aashe's body continued to resist it.

And even resisting: Tan Aashe wanted a cloud to dull the sun on his white armor, and in the sky ionization took place, droplets were

attracted to dust, and a cloud appeared. He switched his manpower to 2-x amp, dug his claws into the rock and ascended.

Halfway up, he caught a glimpse of fluttering black and red, and pressed close to the rockface. One hand slipped into a crack, flexed to jam, anchored Tan Aashe firmly; the other slipped down to the box of metal marbles at his belt.

Then his eyes magnified, analyzed, and he saw it was another bit of Hel Covys' cape. He extended his free hand and telescoped the claws a few cm to retrieve it. Two thicknesses of flanneled felt, tough country stuff, with the gold wires of the spoofing screen between. It should not tear easily.

Tan Aashe's body climbed, his heartrate rock-stable. His eyes searched, unblinking. When he closed them he saw dimly by infrared leakage through his lids. His mind puzzled out the directions Hel Covys must have taken—and then directed his body along slightly different paths.

The cliff was forty-seven meters high, and took the Warden twenty-eight minutes fourteen seconds to climb. He put a hand over the rim, then raised his helmeted head. He saw rocks and moss. Wind whistled in his armor. Despite his suit ventilation and the coolness of the outside air, his underclothing was soaked with sweat. There seemed to be no relief for it. As he got to his feet, a drop ran into his right eye; he blinked rapidly.

When he looked up, he saw the cloak as a red and black blur, had one glimpse of eyes like drops of mercury, before the moon-pale hands and black boots slammed into him and drove him over the cliff.

ARGENT 7 calculated his time of fall as three seconds, and was of no more aid. It was Jin Tan Aashe's Warden training that toggled the manpower's shockrods . . . two seconds . . . tumbled in midair so that his legs pointed downward, rods extended twenty cm below . . . one second . . . relaxed to let the colloidal buffers take the IMPACT—rolling in the moss and branches—coming to a . . . slow . . . halt.

Tan Aashe could not see or hear or feel or move. Then he had a tiny slit of vision, a low murmur of hearing, a faint touch and rumble of muscles, as ARGENT ceased to cocoon his senses, protect him from hurt.

He sat up slowly, looking around; his eyes showed him the woods and stones half enhanced, half blocked out, like a pensketch.

"Warden?" said someone very near.

No one was close. Unless Hel Covys could make himself invisible

to eyes as well as screens—which was probable—*and* could teleport—which was not—or unless . . .

"Coordinator Hel Covys . . . where are you?"

"Above," the voice said, directly in Tan Aashe's ear. He looked up, saw a flutter of red and black on the cliff brink.

"Did I hurt you?" Hel Covys said. "I didn't mean to—no matter how absurd that may sound. Since you had that powered skeleton, and—you are a Worldswarden, aren't you?"

"Yes."

"Flattering that they want me back so badly. But of course they don't; it's the ARGENT they want. But you can't have me yet, Warden. I haven't gotten where I'm going yet. That's why I pushed you; to put some distance between us."

Tan Aashe said nothing. He had an intact airboat only as long as Hel Covys did not see it.

"So you'll know, then, Warden: I'm on my way to a village about two hundred kilometers from here."

"Your home?"

"Just a village. I was there once, a long time ago, got rather fond of the place, said one day I'd be back . . . Warden, you do understand what ARGENT in my blood means, don't you? That I can do more than talk and listen from up here, and hit hard and true? That I could have had lightning strike—drop the cliff on you. If I'd wanted to."

"I know," Tan Aashe said. "Do you know what it's doing to you?"

Hel Covys laughed. "Astonishing things, Warden—but yes, I know I'm going to die rather shortly. Why do you think I told you where to find me—have been dropping bits of my cloak? I just want a few hours. After those—you're welcome to what's left.

"Now, I have a long walk ahead of me, Warden. Fare you well."

The Coordinator disappeared from the crest.

Tan Aashe inventoried his body. He seemed no more than bruised; he had to hope ARGENT was not masking internal injuries.

He looked back toward his airboat, then up the cliff face. He was a Warden and his duty was emerging clearly. He went to the rock and began to climb.

Tan Aashe's body triggered his manpower; the manpower ran, at a steady fifteen kilometers per hour. As long as the man inside could exert fifty grams of effort, the rods would run.

Ten thousand meters ahead, Per Hel Covys' body triggered ARGENT 7; muscle and bone ran as fast as plastic and metal. As long

as the ARGENT mind could think of running, the body would run. Whether an ARGENT mind could sleep, or faint, was unknown.

The power for both runners came from chemical reactions within cells. But the manpower's cells were of metal—rechargeable, replaceable. Hel Covys' were not.

Tan Aashe could, at some personal cost, run much faster. He now saw his duty as plain as ARGENT eyes saw Hel Covys' trail; and he kept his pace.

The meters flew past as steadily as the pulsar tick. The whitish sun of Gilgamesh rose rex—09:00:00, 10, 11, 12—and descended linx, 13:00:00, 14, 15. Through wood and stream and field they ran on. Night came, and Tan Aashe's helmet lamp came on without his jawing the switch; his eyes multiplied the light into a strange, flat, false-colored day. In scrub and trees, Tan Aashe found more scraps of Hel Covys' cloak, clear signposts though the Warden did not need them; found the Coordinator's hat with its mechanical sonoproof—inferior now, of course, to what ARGENT could make within him. Tan Aashe stowed these in his armor and proceeded through the night. As a Warden he did not yet require sleep or food or sex. ARGENT suppressed the desire for them.

02:00:00.

03.

04. Forty hours of ARGENT. For Hel Covys, sixty-five. The Coordinator could be dead now, the death of his blood further hastened by the long, long run. Tan Aashe did not believe this. He did not believe that, should Hel Covys fall short of his goal, he would die quietly in darkness.

In fact, he was certain of it.

Dawn came electric blue, the sun a dazzling line like the edge of a sword on the rex horizon. Tan Aashe emerged from a dark mazy forest into a silver-blue meadow—he was demanding some truth from his ARGENT eyes—and across the gently waving grasses he saw Hel Covys, flat upon his back, a black streak on the ground. His hands, blue-white, were crossed on his chest. His hair, which was long, waved shining as the meadow grass in the morning breeze.

Tan Aashe stopped, watching with long ARGENT eyes. Hel Covys seemed not to breathe. Tan Aashe listened with ARGENT ears, heard a heartbeat, beat, beat. It was not his own, but it was synchronous with his own.

"Per Hel Covys," he said to the faraway figure, in a normal tone.

Hel Covys' silver-blue lips moved, and his voice sounded in Tan Aashe's ear. "Warden . . ." He sat up straight, his quicksilver eyes

shifting. "I wasn't listening for you, Warden. That means . . . you must have . . ." His voice fell to a crackly whisper. "I thought your exoframe ran for you. Warden, why? Can a few hours matter so much?"

"I have my duty."

"Yes . . . I can see as it would matter, to Center. But, oh, how you betray yourself, Warden . . . and now, I see, you come no closer."

Tan Aashe was silent.

Hel Covys sat absolutely still. "I can see you quite clearly—and thus you me, of course. Still, I have had ARGENT longer than you. If we fought, I well might win, despite your exoframe. Though would a toy like that even matter, when we have the electromagnetic spectrum as a weapon? And air, earth, fire, water?

"And still you don't move. Then I maintain my common earthly lead on you as well. Run, run, as fast as you can; you can't catch me, I'm the honeypuff man."

Hel Covys closed eyelids like steel shutters. "I was hurt and frightened by that story, when I was small, Warden. First I was sorry for the little old couple, because they'd done nothing to deserve being so ungratefully run away from. And then . . . all the honeypuff man wanted was not to be eaten, you know. So . . . he runs, and runs . . . and the first soul he stops running to trust is the ravner . . . and the ravner gobbles him up.

"Of course, every adult knows the purpose of that story is to teach children to stay at home, not to run away and be gobbled. But there's the other thing, the idea that honeypuff men have a destiny to be gobbled, and can never run fast or far enough to escape the fate they were baked for.

"I've told this whole childish tale and you haven't moved a milli, Warden. Are you by chance a longtoothed ravner?"

"You know what a Warden's word is worth, Coordinator."

" 'The Worlds in weight.' Yes. I am sorry. Then . . . would you make a bargain with me, sealed with your word?"

"You want to be allowed to reach your village."

"Just *a* village—yes. There's a pass between those hills. Five thousand meters to go, that's all. Give me those meters, Warden—and I give you myself."

"I should like to return you alive, Coordinator. Center has blood waiting for both of us."

"That's kind of them. Then give me my five kilometers and two hours, and I give you the rest of my life."

"Will you answer a question into the bargain?"

"Ask."

"What are you running from?"

Hel Covys' laugh had something of organ chords in it. "Well, I . . . well. What and why, I suppose you mean. I'll tell you how I came to be running, which may not be precisely the same thing. Is that acceptable?"

"It is."

"And I have my distance, and my time? On your word?"

"On Warden's word, you do."

"Sit down then, Warden. Take off some of your armor if you wish; you must be hot. I'm horribly hot."

Tan Aashe sat. He flicked the ventilation blower to maximum but did not unfasten a plate.

The sun was up. Per Hel Covys, silver and black, threw a long black shadow across the calf-high grass. He seemed to float on a pale blue-green mist.

He said, "You must have met other Coordinators, Warden. There are almost as many of us as you, though you're thinner spread. What impression do we leave?"

"Preoccupied. Easily distracted. Prone to leave ideas and sentences dangling."

"You see clearly without ARGENT eyes. Yes, we're all those things. A Coordinator, by nature, you see, can't think directly at a problem for very long without turning it sidewise. When the problem has facets to turn, though, we cannot be bettered at finding solutions.

"Now, a place like Center has thousands and thousands of direct thinkers, who stay on their floors and beat at a problem until it falls—and usually it does. But what results from that is a narrow solution, with no further direction—no application.

"A Coordinator rides the lifts and walks the floors, then, seeing a bit of this and a facet of that. And every so often the facets combine into a jewel, entire and perfect.

"In Center Stack Two, Level One-ninety-four, a synthetics research team develops a new contractile filament. Stack Eight, Level Forty, fluidics designs a compact demand-drip-transfer tube. Stack Six, Level Three-twelve, myomechanics invents an improved response linkage. Same stack, Level Two-fifty, anatomists explore a radical approach to limb-following joints.

"But only a Coordinator can see that colloid-powered exoframe you're wearing, Warden."

Tan Aashe said quietly, "But you receive no credit."

"Blast and burn credit. I'm not jealous of credit . . . *I* say, anyway.

I told you, Warden, no whys direct. I promised not to lie, but I did not swear to tell the truth.

"Not credit. Power, Warden. Of a sort that . . .

"There were once many pretty axioms about the potency of ideas whose time had come. They are all broken. Specialization has killed serendipity—except for serendipity specialists such as I. If I had not chosen to bring Synthetics and Fluidics and Mymec and Anatomy together, Warden, you would not have that exoframe. But I did, and you do, and you use it to chase me; run, run, as fast as I can."

Hel Covys stood, turned to face the sun, turned again to the hills and the pass between. Tan Aashe stood as well. Hel Covys, his hair streaming brightly, looked back at the Warden.

"Warden, I . . . don't know your name."

"Jin Tan Aashe."

"Jin Tan Aashe, will you let me see your face?"

Tan Aashe removed his faceplate, and they looked eye to eye from a hundred fifty meters, a distance as nothing through ARGENT eyes.

Hel Covys put fingertips on his cheeks briefly. "I should have known there would be more of it. Should have searched for it—drunk what I couldn't inject—thrown it down the flash chutes. Though even if all the Cordins in Center labor together—and they may be pressed to—it could take years for them to see what I did." He shook his head slightly. His hands tightened into fists, relaxed.

"Fare you well, Warden Tan Aashe." He turned, paused, turned back. "I didn't lie. After two hours, whatever there is, is yours."

Tan Aashe nodded. He did not take a step. Hel Covys walked on.

After a few minutes—six, said ARGENT 7—Tan Aashe sat down in the pale meadow grass. Sweat evaporated from his face without much cooling him.

Tan Aashe's mother had been a Warden of the Worlds, his father a Warden armorer. Partnerships outside the corps were rare. Tan Aashe had been raised in the house, under the sign of the Worlds-wardens. It was not a sign to be soiled. It was not a house to be entered save in glory, missions accomplished.

Tan Aashe believed this with his whole being until, in the field, he had discovered darkness and uncertainty and the failure of best efforts; discovered that he had a home, a refuge, only when he needed no refuge. And learned why his mother, returned in triumph and glory, still sometimes cried.

Through his armor, the grass was soft to his ARGENT touch, and very sweet to his ARGENT smell; the kind of meadow one could lie in forever, move worlds to return to, die in.

Hel Covys was gone between the hills. Tan Aashe followed, but turned at the pass, climbed a hill, and looked down.

He saw houses of stone and wood, arranged in arcs around large stone ovens. There were plain hot-water sunlight collectors, windmills with carved wooden blades, riding and draft animals.

Children in rose and gray played. Adults in red and black passed and labored.

All heads turned.

Hel Covys appeared from the pass, bright hands outstretched, shining hair flowing. He trailed shafts of rainbow light, violet shifting away to red. The streamers were jagged. Hel Covys was weaving, staggering.

ARGENT 7 had been boosting and killing him for seventy hours eighteen minutes. Tan Aashe listened for Hel Covys' heartbeat: it was regular as a pulsar tick—but four times as fast as Tan Aashe's.

Hel Covys took a few more steps toward the gathering crowd, then sank to his knees. Tan Aashe could hear bone grate.

Two people ran to one of the houses and returned leading a woman with yellow hair, of Hel Covys' age before ARGENT, or nearly so. They took her to where the Coordinator knelt. Hel Covys and the woman spoke. Tan Aashe did not listen.

Hel Covys tottered, fell on his face. The people around him recoiled. Some touched him, drew back at the great heat.

In the clear sky, clouds gathered. Lightning flickered. Hel Covys' fingers, the nails like mirrors, scratched grooves in the dust. Then the clouds ceased to move.

Tan Aashe listened long again. He heard a woman's voice in a country dialect, questioning, urgent; Hel Covys whispering in the same tongue; a sharp, rapid heartbeat, beat, beat—

Then silence.

Tan Aashe looked at the half-gathered clouds. He was by training, by birth, a Worldswarden, and he had a duty. He thought on rain, wind, storm; and the skies answered ARGENT.

Twenty minutes nine seconds had passed since Hel Covys reached the village. Tan Aashe had one hundred minutes of his oath to serve.

He took one of the beryllium spheres from his belt, held it in two clawed fingers, cocked his arm. With his left hand he raised his manpower to highest amp. Arm and wrist went forward, and the metal ball flew at half the speed of sound.

His ARGENT mind reached out and tore electrons one by one from the metal. It began to glow, crackle; bored a blue tunnel of ionization through the sky and drew a small lightning from heaven.

Tan Aashe flung another ball, charged it blue. And another, and another, making the hills echo, the heavens blaze.

When he was out of spheres, he went down the hill, on the far side of the pass. He sat on a stone and removed his gauntlets, then his sleeve armor. He uncatched and removed the back and chest plates, then his sodden innershirt. He looked down at his smooth bare chest, the color of cast pewter.

He stripped the armor from his legs, stood in boots and trunks, open helmet on his bald head, the manpower barely visible against his body. He held his faceplate before his eyes, to catch their reflection in the dark glass strip. They were rippled, colorless pools. He pressed the locator button on his sonde, left it with the piled armor; in a few minutes, when he was finished, ARGENT would cease to hide the signal.

Tan Aashe walked to the end of the pass, just out of view; fired the pocket pistol at a bush, ARGENT mirrors in his eyes shielding them from the dazzling bolt.

The villagers edged back as he emerged from the flash and smoke. Only the woman remained where Hel Covys lay. Finally she too rose and stepped back, staring straight at Tan Aashe. She spoke, and her meaning was clear. She granted permission.

Tan Aashe counted the last few minutes. Oath aside, he did not begrudge them. The Coordinator—perhaps thinking sidewise—had understood finally the Warden's Duty.

Good and evil are not absolutes, but they are nonetheless real things; and you must reward the one and punish the other. The Right is an abstraction, but it exists to be upheld. Though the path of it is never easy, this then is your duty: To ensure, no matter what may be desired or demanded, that justice is done.

Because he wanted to go home greater than he had departed, Hel Covys had taken a dose of power and run. For this, the Warden pursued him.

But Hel Covys, who alone knew how to take ARGENT and survive, had not trusted even himself with the knowledge. This was the other reason for his running; for this, Tan Aashe held his pursuit.

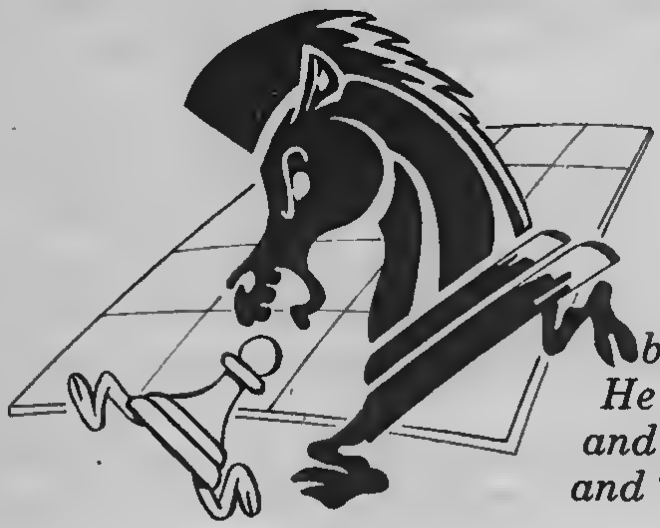
Hel Covys had given the Worlds some time before they should have ARGENT without constraints; perhaps even the time to mature enough for it. And for that, some thunder, some lightning, some glory, was small enough justice.

Worldswarden Jin Tan Aashe knelt and took the burned-out shell of Coordinator Per Hel Covys in his arms. Then he carried him from his people, away up into the hills; and beyond.

WHEN THE CHESSMEN WALKED

by Tim Colley

art: Marc Schirmeister



The author of this—thing was born in London, England, in 1938. He grew up in Melbourne, Australia; and worked in Australia, Hong Kong, and Toronto in various writing trades.

Developing a functional mini-brain small enough to fit into a chessman was the first stage, but the problems of getting them to move themselves around the board were fearsome. The entire think-tank at Imperial Intellects Inc. were stumped until an unknown researcher had his brainwave: forget about electronic control and all the problems of shielding, crosstalk, and power supply—and genetically engineer a living simulacrum for the purpose. . . .

It was an astounding breakthrough. And it was inevitable that these walking, stalking, talking figures start a craze such as the world had never seen. Chess clubs replaced discos, launderettes, and drive-in banks; hamburger franchises fought with each other, sponsoring chess marathons on prime-time TV; several promising small wars in Africa and Asia were successfully transferred to the chessboard with the saving of several hundred thousand lives. It became a mania that swept the world.

But that excitement was nothing when a process was developed whereby the chesspeople could reproduce themselves. *That* caused an absolute ferment. And with typical human greed and competitiveness, the race was on to produce ever more valiant pawns, wilier bishops, and superior kings. Fortunes were made and lost as the chessmen had their capacities ruthlessly expanded.

Until the bubble burst. The hyperdeveloped pieces with their grossly enlarged heads played a game almost beyond human understanding.

No longer were the neighborhood chess clubs the glittering focus for the crowds. Only the toughest hardcore players frequented them now—and they had reverted to pushing around simple little stylized figures on a board with only sixty-four squares. . . .

And so it is today that you never hear that thrilling, pulse-stirring enquiry that once made you tingle all over:

"Bred any good rooks lately?"

SOLUTION TO NO VACANCY AT ALEPH-NULL INN (from page 29)

The clerk simply requested over the laser intercom that the occupants of each room move next door to the room with the next higher number. This left Room 1 vacant for the creature from Andromeda.

A few days later, when the Inn was still filled to capacity, ten humanoid couples on a parallel-universe tour arrived at the Inn. Each couple had a reservation for a separate room.

The Inn had, of course, no difficulty taking care of them. The clerk merely moved everybody to a room with a number ten higher than the number of the room they were in. This left rooms 1 through 10 vacant for the ten couples.

In a similar manner the Inn found rooms for thousands of guests with reservations who arrived during the next twelve days, even though all rooms were occupied when each new guest arrived.

On the thirteenth day, however, an unusual event occurred for the first time in the Inn's history. A convention had been scheduled for science fiction buffs from *all* the parallel worlds associated with the Black Tube, and an infinite number of fans showed up. Every single one had a reservation.

At first the clerk was puzzled over how to accommodate such a large set, but one of the fans, a youngster who somewhat resembled a purple ostrich, had been studying Cantorian set theory in school. "It's ridiculously simple," he said to the kangaroo. "All you have to do is . . ."

What suggestion did he make? Turn to page 94 to find out.

A PESTILENCE OF PSYCHOANALYSTS

by J.O. Jeppson
art: Tim Kirk

The author, a psychoanalyst herself, here promulgates a peculiar parody.

As usual, an undertone of argument permeated the sacred precincts of the Psychoanalytic Alliance, an exclusive luncheon club known to its intimates and its enemies as Pshrinks Anonymous. The Oldest Member was holding forth. This also was not unusual.

"I tell you again that these new-fangled analysts use peculiar words that no one understands. If I hear any more about the parameters of the paradigmatic processes I'll eat my hat."

"You've got it wrong," said one of his younger Freudian colleagues who liked to keep up to date, "and you haven't got a hat anyhow."

"Furthermore," continued the Oldest Member, "I object to the pollution to which all of you have subjected the name of our club, adding a silent **p** to shrinks. . . ."

"Perhaps it was inevitable," said one of the Interpersonals. "And even ominous," she added.

For once the Oldest Member looked pleased to be interrupted by a female and an Interpersonal (in order of annoyance).

"Ominous?" he asked.

Simultaneously, the rest of the membership groaned and bent closely over their desserts, Bananas Castrata Flambé. The Oldest Member nodded encouragingly at the Interpersonal, who grinned.

The experience I am about to reveal [said the Interpersonal] happened only recently and has been much on my mind. This vignette, while obviously clinical, is not a case, since the person who brought the problem to my attention was not a patient but a colleague I hadn't seen for years, a Pshrink I used to know when we both carried

large iron keys to the locked wards of a well-known psychiatric hospital.

This colleague had always been a rather pedantic, phlegmatic man who yawned his way through analytic school some years after finishing his psychiatric residency when the rest of us were already analysts, struggling to stay afloat on the ever-increasing ocean of jargon. I recalled that this down-to-earth type had a limited vocabulary and what some of us referred to as poverty of imagination. He had, naturally, left Manhattan for some Other Place when he started his analytic practice.

I was shocked, then, to get a frantic phone call from him, begging me for a private lunch because he needed to discuss a confidential problem affecting his work. I told him my noon hour was free and he said he would bring lunch in his briefcase.

As we munched corned beef on pumpernickel in my office, I discovered that he was in town for one of the psychoanalytic conventions. Being allergic to cigar smoke, I had not yet been to the meetings; and I wondered what psychologically traumatic paper had affected my old friend.

"Listen, I remember that you're a sci-fi buff," he began.

"SF!"

"Whatever. Do you believe in that stuff about ESP and dreams that come true and mysterious extra-terrestrial beings and whatnot?"

"I'm still waiting for the hard evidence."

"Well, I don't have any, but after attending this convention it seems to me that I detect—something."

"Alien influence?" I asked facetiously through my corned beef.

"How did you know? Are you part of the conspiracy?"

I began to wonder whether or not I was doing a regular psychiatric consultation after all. I swallowed the last of my sandwich and studied my colleague. While plumper and greyer than he had been, the striking change was the faint twitching of his shoulders, possibly due to muscle strain caused by his new habit of looking nervously over them.

"No," I said. "Tell me what on Earth you are talking about."

He sighed. "I never was much good with words, you know. I barely made it through analytic school because I had so much trouble mastering the vocabulary. Since then I've tried—oh, how I've tried, and then my wife . . ."

"She's in the field, as I recall," I said.

"Yes, a—" (he named one of the more verbally agile allied fields).

"She tried to help me; and so did some sympathetic colleagues, because at meetings I was a total loss. My papers were so easy to understand that nobody paid any attention to them, and I couldn't understand what anyone else was saying. Finally, after years of study and trying to catch up, I began to use and even understand some of the important words."

"The jargon."

"A pejorative word if I ever heard one," he said with a shrill laugh. "You see—I did it! I'm always doing it!"

"Using a big obscure word?"

"No! I mean, yes—a word with a **p** in it!"

"I am puzzled . . ."

"There, now you're doing it! I'm convinced that it's a disease, catching and deadly dangerous."

"Unfortunately our field is riddled with **p**'s—psychiatry, psychology, psychoanalysis . . ."

He moaned. "That's just it. That's why we're the conduits for the malevolent influence from outer space."

"The what?"

"You heard me." He bit into the untouched second half of his sandwich, eyeing me suspiciously over a fringe of buttered lettuce sticking out. My colleague was a WASP who always ate butter and lettuce with his corned beef sandwiches, which may be another reason why he had to emigrate from New York.

I decided to humor him. "Supposing there is a mysterious alien influence—how do you know it's malevolent?"

"You haven't been to a psychoanalytic convention lately, have you?"

"No."

"Then don't ask. Or maybe I should tell you. No, I'll just describe my own symptoms. It began with dreams, and don't try to analyze them the way Siggy would have."

"You know perfectly well that I'm non-Freudian. Tell me about your dreams."

"You sound just like me when I'm humoring a psychotic patient."

"Yep."

"What the hell. The dreams come every night. And they're full of words, most of which begin with **p**, that come to life in my head and chase each other around and threaten me. When the dreams began, I became aware of how everyone in my local psychoanalytic society talks like that. I used to feel I didn't belong, but suddenly I began to be part of the group."

"Comrades in jargon?"

"That's it. You don't know how I've been fighting it since I entered your office for lunch. Trying not to use many words beginning with **p**. I can feel them straining at the leash inside my skull, trying to get out, to join an invisible network throughout the terrestrial electromagnetic sphere. . . ."

"Whoa!" I shouted, since his face was beginning to turn purple. "It does seem to be true that our fellow Pshrinks speak in alot of **p**'s. Does it matter whether they are silent or vocalized—the **p**'s, I mean?"

"I don't think so, but the vocalized seem worse. Proclivities instead of tendencies, parsimonious instead of stingy, paranoid instead of suspicious, and of course the multitude of words beginning with the unvocalized **p** in psycho."

"You'll have to blame most of the problem on the ancient Greeks."

He frowned. "Maybe they were subject to alien influence first. Come to think of it, maybe you're one of the ringleaders. You've got several **p**'s in your name. The world is full of pee—"

As his voice rose in a wail, I interrupted. "You can always go to a Freudian and have your urethral complex analyzed."

["P-U!" murmured one of the club's pundits.]

My highly disturbed colleague gulped and began again, in a whisper. "It's much worse out where I live and work."

"Cheer up," I said, "around here they're into illusory others and imaging and identifications that are introjective . . ."

"But where you have introjective you also have projective!"

["At least that gets us off the excretory system and onto more interesting anatomical analogies," said one of the Eclectics.]

"Now let's not get carried away," I admonished him. "The world is full of people who don't use words beginning with **p**."

"Is it? My son came home from college asking me to define the parameters of a meaningful marital pairing. My daughter at medical school heard a lecture on probability factors in the success of paternal participation in parturition. When I complained to my wife that the passion was going out of our partnership, she said I was predictably puerile. Then I started having repetitive dreams of being surrounded by a posse of parameters with pink faces and pallid tongues, or possibly the other way around."

"Well, I agree with you that all these **p**'s do get to be pretentious, pompous, ponderous, and pedantic," I said.

"Pshaw! You've got it too."

"How can any of us help it?" I said, hoping that if I got into the

spirit of the thing he might start analyzing me and stop being so crazy himself. "Sometimes I think that the patients have it much worse than the Pshrinks. Why just the other day . . ."

"You're right. Nobody says anything simply, any more. Even patients postulate prohibitive propositions like trying to persuade me to cure their passive aggressive personality with psychodrama or their psychosomatic punishment with positioning patterns. They say they want profound sex and peak experiences . . ."

["I think I may be having one now," snarled a Freudian.]

" . . . and I ask you, isn't it likely that we Pshrinks are the most likely to be affected by all these **p**'s? Day after day we listen to the voices of the people, talking and talking and talking . . ."

"Which accounts for why we tend to get verbal diarrhea when let loose from our offices," I said, proud that I had managed a sentence with no **p** in it.

He was not amused. "Just last week one of my patients complained about the propinquity of the couch to my chair."

"Perish forbid," I said without thinking.

"Where did you get that expression!"

"My father used to say it when he wasn't actually swearing."

"Aha! You see! Unto the fourth generation!"

"If you go back that far they weren't speaking English."

"I was speaking metaphorically, implying that the alien influence began a long time ago," he said, picking crumbs off his pants. "My theory is that if you think and speak often enough and hard enough in words containing prominent **p**'s, your mind jells up and gets petrified."

"Paralyzed by **p**'s?" It was impossible to resist.

He glared at me. "You are then locked into an alien mind somewhere in the universe—maybe in outer space, maybe hiding somewhere in our solar system. I don't like what could be developing in the middle layers of Jupiter, or under the ice cover of Europa."

Since his voice was rising again, I said, "So what?"

"Idiot! Don't you understand that after the aliens have gotten enough human minds locked to their system, they'll take control—take over Earth civilization!"

"I think you are—you should excuse the expression—projecting. Haven't you been worried about how the lunatic elements are trying to take over our field? I seem to remember now that you wrote a scathing paper on fringe groups."

"A paper that psychoanalysts and psychiatrists and psychologists perused without perceiving the profundity of the principles!"

"Hey! You have it bad, don't you!"

He burst into tears and threw himself prone on my couch.

The afternoon sun streaming into the window made the room warm, and I was too bemused by the problem to turn on the air conditioner. My next hour, I tardily recalled, was also free, since the patient was a young psychoanalyst in training who was at that moment delivering a paper at the same convention from which my friend was playing hookey. Soon my colleague was snoring and I was drowsy enough to have a hypnagogic hallucination . . .

["You mean you fell asleep," said another Interpersonal.]

["I did not," she said.]

I had a momentary impression of strange lines of force from far away, converging on my snoring colleague and then transferring to me. It was rather eerie, and I was glad when he woke up and bounded off the couch.

"You're marvelous! I'm cured!" He bent down, hugged me, grabbed his briefcase and made for the door where he paused. "It's all clear to me. I just had to tell someone about it in order to feel ok. I guess I was only a carrier."

"You perfidious proselytizer!" I exclaimed.

"Sorry about that. I'm going home. Maybe I'll see you at next year's convention." He held up two fingers. "Live long."

"And prosper peacefully," I said as he left.

A pregnant silence ensued around the luncheon table when the Interpersonal finished speaking.

Suddenly and simultaneously some of the more argumentative members of the club began to talk.

"The parameters of the problem are . . ."

"The physiological principles in pronouncing the **p** . . ."

"You Interpersonals and your parataxic distortions . . ."

"And your participant observation . . ."

"Prostituting the precepts of psychoanalytical . . ."

"Perseverating in the problem of the **p** . . ."

"Perhaps it's only a problem of psychic phenomena . . ."

"Probably poisoned by polypramasy . . ."

"The proposition is positively polymorphically perverse . . ."

And just as suddenly they all shut up. There was an uncomfortable shuffling of feet under the table. Then the youngest member, a first year psychiatric resident allowed in to learn from his superiors, spoke timidly.

"Perhaps it's the fault of philosophers. I almost majored in phi-

losophy in college, and it seems to me that they promote a plethora of phrases . . ." He stopped abruptly, eyes wide.

"Piffle," said the Oldest Member. "None of the jargon is absolutely necessary, although I'm partial to 'id' myself."

"Would you willingly give up 'penis envy'?" asked the Interpersonal.

"I think you should keep it in your prefrontal cortex," said the Oldest Member with frosty dignity as he stroked the erect waxed tips of his silver moustache, "that *I* do not need to have penis envy. Nor did the Master . . ."

"Who was primarily a physicalistic psychobiologist," said one of the more militant non-Freudians.

"But the Master had no **p**'s in his name," said the Interpersonal, favoring the Oldest Member's moustache with a glance of unalloyed admiration.

"Thank you," said the Oldest Member, patting the Interpersonal on the patella. "You do think that hypothesis about aliens is a lot of stuff and nonsense, don't you?"

The Interpersonal shrugged. "I haven't the slightest idea. I wish, however, that I didn't have this insatiable desire to go home and read *Pickwick Papers*—or possibly promulgate a parody."

SECOND SOLUTION TO NO VACANCY AT ALEPH-NULL INN (from page 87)

The ostrich proposed that the clerk move the occupants of each room n to a room of number $2n$. Those in 1 went to 2, those in 2 to 4, those in 3 to 6, and so on. This vacated every room with an odd number. Since there is an infinity of odd numbers, the SF fans (all of whom *were* rather odd) were easily accommodated.

If you care to learn more about the paradoxes associated with aleph-null (the number of the set of all positive integers), and Georg Cantor's higher alephs, a good place to start is the second chapter of *Mathematics and the Imagination,* by Edward Kasner and James Newman, or the chapter on "Aleph-null and Aleph-one" in my *Mathematical Carnival.*

THE SF CONVENTIONAL CALENDAR
by Erwin S. Strauss

The month after the World SF Con(vention) used to be a dead time. But now September and October have become a major season for social weekends with your favorite SF authors, editors, artists, and fellow fans. For a longer, later list, and a sample of SF folksongs, send me an addressed stamped envelope (SASE) at 9850 Fairfax Sq. #232, Fairfax VA 22031. The Hot Line is (703) 273-6111. If my machine answers, leave your name and area code CLEARLY, and I'll call you back. When writing cons, enclose an SASE. When calling them, give your name and reason for calling right away. Look for me at cons as Filthy Pierre.

NorEasCon II. For info, write: **Box 46, MIT PO, Boston MA 02139.** Or phone: **(617) 236-2000** (10 AM to 10 PM only, not collect). Con will be held in: Boston MA (if location omitted, same as in address) on: 29 Aug.-1 Sep., 1980. Guests will include: Damon Knight, Kate Wilhelm, Robert Silverberg, Bruce Pelz. Phone number above is for Sheraton Boston Hotel. The World SF Convention for 1980. Join only at the door. $45 for four days.

MosCon. (208) 882-1574. Moscow ID, 12-14 Sep. George Barr, Frank Denton, Jerry Sohl.

OtherCon. (713) 846-9782 or (713) 779-2588. College Station TX, 12-14 Sep. Jack Chalker.

Intervention, Box 151366, Salt Lake City UT 84115. (801) 355-8076. 26-28 Sep. M. Z. Bradley.

RoVaCon, Box 117, Salem VA 24153. (703) 389-9400. Roanoke VA, 10-11 Oct. Fred Pohl, Kelly Freas, Elizabeth Taylor Warner, Paul Dellinger. Mrs. Warner will award drama scholarships.

NonCon, Box 1740, Edmonton, Alta. T5J 2P1 Canada. (403) 469-0719. 10-12 Oct. V. McIntyre.

OctoCon, c/o Spellbinders, Box 1824, Santa Rosa CA 95402. 11-12 Oct. A major new Western con.

RocKon, Box 9911, Little Rock AR 72219. 17-19 Oct. A. J. Offutt, the Lynches, Jo Clayton.

WindyCon, Box 2572, Chicago IL 60690. 24-26 Oct. Robert Sheckley, Gardner Dozois, Wilson Arthur (Bob) Tucker. This is usually the biggest convention of the year in the Midwest.

MileHiCon, Box 27074, Oenver CO 80277. 24-26 Oct. Stephen (Covenant the Unbeliever) Donaldson, Roy Tackett, Ed Bryant. From the folks who'll bring you Denvention next year.

World Fantasy Con, c/o Miller, 239 N. 4th, Columbia PA 17512. Baltimore MD, 31 Oct.-2 Nov. The WorldCon for the serious fantasy fan. At the Hunt Valley Inn, north of Poe's city.

HallowCon, c/o Rim of Starlight, 160 Foster Rd., Lake Ronkonkoma NY 11779. Hempstead NY, 31 Oct.-2 Nov. A Star Trek/SF con, if the World Fantasy Con is too heavy for your taste.

PhilCon, c/o Lawler, 2750 Narcissa Rd., Plymouth Meeting PA 19462. Philadelphia PA, 14-16 Nov. Bova, Freas, Sheckley. The oldest SF con, back home in downtown Philly where it belongs.

OryCon, Box 14727, Portland OR 97214. (503) 761-8768. 14-16 Nov. Fritz Leiber, F. M. Busby.

Oarkover Grand Council Meeting, c/o Armida Council, Box 7501, Newark OE 19711. Wilmington DE, 20-30 Nov. Katherine Kurtz, Marion Zimmer Bradley, C. J. Cherryh, Nancy Springer.

LosCon, c/o LASFaS, 11513 Burbank Blvd., N. Hollywood CA 91601. Anaheim CA 28-30 Nov., 1980. Larry (Ringworld) Niven. The Los Angeles group's annual con, in its 7th edition.

WesterCon 34, Box 161719, Sacramento CA 95816. Held over the July 4th weekend in 1981.

Denvention II, Box 11545, Oenver CO 80211. 3-7 Sep., 1981. C. L. Moore, Clifford Simak, Rusty Hevelin, Ed Bryant. The 1981 WorldCon. It's not too early to start planning summer vacations.

GUARDIAN

by Jeff Duntemann

art: Hilary Barta


BRATA

Mr. Duntemann reports he's now working, still for Xerox Corporation, in Rochester NY, and that Xerox machines are not as complicated as they seem: they're much worse. Since his grandmother gave him a 1912 Underwood when he was 10 years old (he's now 27), he has hammered out 86 short stories. He wrote 54 before his first sale, 63 before his second. This magazine has purchased 3 out of his most recent 5. The author is also an amateur radio operator; his new call sign is KB2JN.

Someone was stealing the Princess's skull.

The Guardian's eyes were clouded with the slime of the bog. He tried to clear them, but the jets were clogged. All he could see were two small human figures leaping from the granite slab above him, almost atop him, and vanishing into the gloom. One figure held the skull in his hands.

Rage! All three hooded eyes were now above the bog's surface, swinging back and forth on their armored stalks, searching. Three hundred years of silence and boredom had lulled the Guardian into bleary carelessness. Not for three centuries had he seen, heard, or smelled a human being. Now the Princess's remains had been defiled, and he had not done a thing.

The two shadows plunged on away from him. A thundering command to halt entered his speaking trumpet, but only a splattering gurgle of mud emerged. Soon the shadows were gone.

Protect the Princess! something howled inside of him. The black snout of his heat-beam rose above the surface of the bog and swung in the direction of the fleeing humans.

Kill no man without warning, cautioned the same howling thing, the thing he called a soul. His trumpet remained mute.

So be it. The mud around the Guardian began to heave and bubble. Slowly—he had lain in the slime for fourteen hundred years—the

Guardian ripped himself from the bog's grip and lumbered after them, dropping gobbets of slime and bits of torn vegetation behind.

"Father! Abbot! Lord help us all! In the Name of God, Satan is at our doorstep!"

Abbot Gorman Izek looked up from his little bench in the courtyard of the abbey. Distantly, beyond the walls, he heard shouts and screams. Brother Jeshua, the abbey doorkeeper, was heading for the bench at a run. His face was beet-red. When he stopped, panting, he was speechless with terror.

"Satan does not come in the Name of God, brother."

Jeshua said nothing. The poor monk gestured wildly toward the doorway, his mouth gaping. Izek felt a touch of fear. Simple though he might be, Jeshua was no coward. Time and again he had faced down brigands at the abbey door. And there were those shouts to consider.

"Get me my cape. Bring holy water and a large crucifix—the one from the library. Run, brother!"

Jeshua needed no prodding. He was out the door at once.

Abbot Izek was not prepared for what he saw on the dirt street outside the abbey gate. The street was otherwise empty. Up and down, from the mayor's residence to the marketplace, doors were closed and windows shuttered tight, even in the August heat.

There before him was a Thing.

It was a mound of slime as big as an oxcart, speckled with duckweed and trailing long green fronds and cattails. Several protrusions waved back and forth. Its upper surface was caked and drying; from underneath it still dripped. A trail of mud lay drying in the street from the direction of the marketplace.

Izek felt his mouth go dry. Each of the three waving protrusions was a stalked, hooded eye, each with a slitted pupil of burning red. All three eyes glared at him, and the thing stopped all motion.

Only hearing several monks creeping up behind him kept him from breaking and running. He had decided years ago that he did not believe in Satan, except as a symbol of irredeemable evil, or as a bogeyman to scare peasants into fattening the Sunday collection. Now a lump of stinking slime had walked up to the abbey's gate. The monks and the whole village were waiting for him to do something about it.

He took a deep breath and stepped forward, the crucifix held before him. The three red eyes followed him, but the creature did not move.

"In the Name of the Lord of Hosts, Who reigns over all things

seen and unseen, I bid you speak, or begone!"

Something in the midst of the creature gurgled, and sprayed mud at him. Izek stepped back. It was as the old books of devils, witches, and superstition had spoken. A halo of flies nibbling at the duckweed, spitting slime, stinking beyond belief—he could conjure no better image of Beelzebub, Lord of the Flies.

Izek was shaken to the core. He would have much to confess, if he lived to possess his soul until sundown. No exorcisms from the old texts came to his tongue. His trembling right hand grasped the little vial of holy water Jeshua had fetched. Izek would do the best he could.

"This place . . . is holy . . . consecrated to the Lord's work. In the . . . Name of the Father, King of Kings, of His Holy Son our Lord Jesus Christ, and the Holy Spirit proceeding from them, I command you: Leave us! Return to your infernal kingdom and trouble this place no more! Begone!"

Finally his fingers worried the cork from the old vial, and Izek flung the little stream of water square at the thing. He held his breath.

Nothing happened. It was the devil's move now. Izek's eyes fogged until he dared to blink. It was impossible to look away.

Then he saw a tiny glint where the holy water had hit it. The glint of . . . metal? The rationalist inside Izek rose up and shouted for joy. If he were wrong he would pay with his soul. He remembered the little three-legged machine which old John Kearns had unearthed in his cornfield. It had come alive somehow, and had twittered and danced in the street for an hour until it died again. Earth was old. Mankind was old. Not all of man's works had been as simple as swords and plowshares.

Without turning his back on the thing, he called to the monks behind him. "Bring holy water. All of you. Bring all the holy water in the abbey. Drain the fonts in the chapel and the refectory. Do the same for all the fonts in the cathedral. This is no ordinary demon. See its halo of flies, and do my bidding!"

Izek heard Jeshua and the others hurry away. It seemed an eternity until they returned, bearing buckets and tubs and mugs of holy water. The creature had done nothing in that time except gurgle and wave its eyes about.

There was no longer any doubt in Izek's mind. The exorcism would be a mockery, but . . . many eyes were on him. He had had plenty of time to turn rolling phrases in his head, and immediately began to shout them, marching around the creature and heaving holy

water at it by the bucket. The monks by the gate were on their knees, eyes on the ground, murmuring prayers for deliverance. Izek could barely keep from smiling.

Rivers of mud flowed down from the thing and pooled in the street. There was much metal in it, metal and glass and strange mechanisms. It had articulated metal arms with many fingers snapping and working at their ends. The hoods over the eyes were worn and battered grey, but all the rest seemed bright and new. Its shape was that of a turtle, its back scaled with hexagonal tiles of silver metal, bright as mirrors. Instead of legs or wheels it rested on two blunt-ended, pale white cylinders, like sausages.

Satan and Beelzebub again took their place in folklore. This creature was the work of man. Izek immediately began wondering if it could be put to use.

A trumpet-like structure jutting from the scaled carapace still seemed clogged with mud. All through the exorcisms it had sputtered and spat. Izek noticed that and threw two large buckets of holy water directly into the trumpet's mouth.

The blatting roar which cleared the trumpet nearly knocked Izek from his feet. It sent the monks at the gate running for their lives. Just as well.

The creature wasted no time, now that it could speak.

"I command you, return the skull of my Princess to me."

Izek shook his head in wonder. The voice was plain and cold, but it might have come from the throat of a man, were it not so loud. Izek reminded himself that it was a machine.

"Hush, automaton. Machines do not give commands. You will obey *me,* Abbot Gorman Izek of Holy Word Abbey."

Again, Izek was shaken. The thing laughed. "The only one I ever obeyed has been dead for seventeen hundred years. I will do as my soul directs me. Return the skull of my Princess."

This time Izek laughed, matching arrogance with arrogance. "You have a soul? An emptier claim I never heard. Souls are made by God, not in a tinsmith's shop."

This time the creature did not laugh. "Men and their souls are made in bedrooms, not by God. Return the skull of my Princess to me."

The machine's blasphemy angered Izek. "I will not deal with mud-wagons who jape at the Lord. There are other things to do." Izek turned toward the gate.

"Stay, Man."

Izek felt a flash of heat and heard a crack. One of the old wooden

buckets lying in the street had burst into flame. He spun around. A black tube protruding from the creature's middle was aimed at the flaming bucket. The tube's tip was dull red, fading now to black.

Izek had been afraid of something like that. "We must . . . talk. My villagers are simple people. You frighten them." *And me as well, but never let on!* "Will you follow me?"

"I will."

The two sausage-shaped supports beneath the creature lengthened and contracted like live things. They pulled it around in the direction Izek was walking. Ringlike swellings appeared at intervals along the lengths of the white supports. These swellings moved backwards along the supports, pushing the creature forward. Izek found the motion of the supports somewhat nauseating. Without looking again at the machine he walked briskly down the street toward the cathedral.

Izek had bolted the tall oak doors of the cathedral, and had lit a taper from the vigil rack in the vestibule. The bizarre procession of man and machine down the main aisle had sent Lazaro the verger screaming out a side door. The abbot bolted those as well. However insane the forthcoming negotiations would be Izek intended to pursue them alone.

There was no sanctuary rail. Izek climbed the four shallow stone steps, and watched uneasily as the machine slithered after him with no difficulty at all. The white supports heaved and gripped the steps as though alive. Izek passed wide around the marble altar on its four gilded pillars, and bowed from habit to the Sacrament in its small golden tabernacle.

The cathedral's rear wall had been cut into the face of a limestone bluff. At the rearmost point of the apse the baptismal nook had been cut deep into the stone of the bluff. A slow spring trickled water directly into the font from a crack in the limestone.

Izek stopped in front of the baptismal nook and compared its size to that of his companion. He put the taper in a stand and faced the three swivelling eyes. It was best to be direct, and forceful if possible.

"What makes you believe I have taken anything from you?" Izek asked sharply. "A skull? Does an abbot collect skulls?" Izek tapped the wrought iron candle stand impatiently.

"Abbots, monks, and priests tend to the dead. Or they did seventeen hundred years ago. A religious walking through a swamp and finding a skeleton might wish to give it a more conventional burial."

Izek nodded. Much of Ilnoy between the two great rivers was swamp, viscous swamp. One such stretch of bog nearby was haunted, so the peasants said. He failed to see why anyone would risk his neck in such a place. None of it made sense to him. The machine was probably insane. "A logical deduction. Sadly, I have heard no word from any of my people of finding a skull in any swamp. However, I will help you locate it, if you like. I am a simple man. Much simpler than those who constructed you. I would much like to know why it is that you have wallowed in a swamp for seventeen centuries, looking after a skull."

The machine said nothing immediately. The flickering of the taper cast tiny glints on the stone walls from the many mirror-bright facets covering its body. When it spoke again its voice was softer, and echoed less in the cavernous church.

"You do swear upon your soul to help me find the skull of my Princess?"

Izek kept his face blank. How could one perjure oneself to a machine? "I do so swear."

"Good. So listen well. I was taken from the King's Guard during the last year of his reign, and given a soul by Heolo Birn, the King's Cybermaster. I swore upon that soul that I would care for and protect Princess Divin Rea Hol Wervig for all time. The King perceived that he had many enemies in those bad times, and the Princess was his sole remaining treasure. After that I was at her side every hour of every day.

"There were other conflicts and other battles. Earth had an enemy which men called Uihlein's Anomaly. That war was already a thousand years old when the Anomaly engulfed the Earth and stopped all powered machines—myself included—for three months. When it vanished there was nothing left but death and madness. My Princess survived, and I took her away with me.

"We lived in what wilds remained. She matured. I taught her to hunt, to fish, to build fires. We sang. We sculpted. Always alone. I trusted no one, and my Princess at times hated me for it. But I had given Heolo Birn my word, upon my soul. She lived, all told, one hundred twelve years. Then her heart failed irreversibly.

"It was agony to see the life go out of her, but that is the human way, and my soul found no fault in me. I took her body to the center of the most treacherous swamp I could find, and built a granite bier. I laid her down, and did not move again for seventeen centuries. When predators approached, I burned them down. When humans came near, I frightened them away, craven ignorant things which

they had become.

"Some hours ago, the first human beings I have seen in three hundred years stole my Princess's skull from her bier. I cannot kill a human being without warning, and my trumpet was clogged with mud. My problem should now be obvious even to so simple a man as you."

The three doleful eyes remained fixed on Izek. The abbot shrugged. "I will do what I can." Inwardly he was quaking with excitement. With a machine like this at his command, let the Cardinal in Loovul *dare* not grant him the vacant bishopric! He could be a cardinal himself, or pope, or an emperor! He could lift mankind from ignorance . . . as soon as he learned how to control it.

"What do you suggest?" the machine asked softly.

Izek beamed. The thing was asking *him* for advice. He had to keep the advantage until he found the knowledge he required. "First of all, I have to find out if one of my villagers was, in fact, your thief. This may take some days. I promise you, no local man will keep the skull from me if I demand it. If the thief was a wanderer . . . other plans will have to be made.

"I will need five days to question the village. During this time I must hide you so that you will not frighten my people further. Will you promise me, upon your soul, to remain in that alcove regardless of what happens, for those five days?" Izek pointed at the baptismal nook.

Two of the three eyes scanned the nook. "I do so promise, upon my soul. Will you block me from sight? I can do nothing about my appearance."

Izek nodded. "It will be done. All you need do is remain silent and still."

"Then do your work, Man." The machine pivoted on its nauseating supports and backed slowly into the nook. It was a close fit, Izek noticed; but it would do. And he certainly intended to block the creature from sight.

Izek took two sets of violet curtains from a cabinet in the sacristy, and hung them just inside the opening to the baptismal nook. Where the curtains would not hang so as to insure total coverage, Izek instructed the machine to support the curtains from within with its many arms. The creature complied without a word.

With the machine hidden, Izek extinguished the taper and hurried out of the cathedral. He crossed the road to the abbey and greeted the fearful monks with a triumphant grin. The abbot wasted no time implementing the rest of his plan.

"Brother Hamil, fetch Byron the stonecutter from his house and bring him here, with all his sons and hired hands. We will need mules to haul those large blocks from his yard which were to repair the west wall. I have the beast trapped helpless in the baptismal nook. Find whatever stonemasons and tradesmen there are to assist us. We must seal that nook with stone so that it becomes again as part of the bluff."

Still fearful, but beginning to have hope, the monks left on their errands.

The stonemasons worked for three days. The work might have gone more quickly, but the men stopped work every few seconds to cross themselves and mumble prayers. Abbot Izek was deliberately vague about what it was which lay sleeping behind the purple silk, but he appeared every hour to sprinkle the curtains with holy water. Nothing stirred inside—Izek knew he would have to lay the stone himself if anything did—and in time the narrow archway was filled with smooth stone, separated by not even the tinest crack.

Izek blessed the new wall and read several prayers against devils and imps from an old missal. So perhaps the creature *could* throw fire; fire was impotent against stone. The machine would stay in there until Izek saw fit to let it out.

When word spread that Abbot Izek had trapped a major demon in the stone of the bluff, doors and shutters opened and there was a torchlight parade to Friday's confessions. Word would eventually reach the Cardinal—Izék smiled and disappeared again into the abbey library.

There were thousands of books in the dusty stacks. Books stood three and four deep on the ancient shelves. Only theological texts drew any interest from the monks. The others lay forgotten.

The oldest and strangest books seemed, oddly enough, to be the youngest and freshest looking. To them Izek went, thumbing past meaningless chapters and puzzling over difficult phrases. He meant to find out if machines could in fact have souls; and if so, how those souls could be subverted and commanded.

Late Saturday night, Izek's tired eyes leapt upon a passage in the rambling memoir of a man who had lived nineteen hundred years in the past. He had been a monk, but had also been a tender of machines. The pictures in the book, as in many of the old books, were clear, but impossible to believe. He saw one which depicted an army of machines swarming over a monstrous building, laying stone slabs and welding steel beams. And yet another made his heart race:

a skeletal machine made of silver spheres held together by coppery cables, standing on many insect-like legs. Cradled gently in four slender metal arms was the body of a very old man bent in the contortions of a painful death. Beneath the image was a single line in bold type: WHERE IS MY MASTER NOW?

Izek read like a starving man:

" . . . Can a machine have a soul? After all these years I have wondered, and now I realize there may never be an incontestable answer. Remember that we have no more reason to believe in our own souls than the reason of faith, and faith is not lacking in the machines. In fact, they respond as strongly to my denials of their souls as I would to theirs of my own. Surely, they have something. They speak, they sing, they laugh, they tell tall tales. I have heard one comfort its creator, and seen another mourn bitterly at its creator's death. Do not these things well from a soul, albeit a soul of metal and plastic? These machines can be kind, ruthless, gentle, persuasive—and with an honesty that men's souls should see more of. Let us call it a soul, then. A soul made by man, and not by God. Let us see its fatal flaw: The machines recognize the absolute authority of their own makers, as we recognize God's over us. The makers are gods, but the machines are the immortals. When the gods die, as they must, what then? Some of the machines imitate their makers, and turn themselves to piles of rust or slag. Others wander about, fanatically mulling over their last orders, slowly growing childish and insane. It is sad to see something begin so wise and end so foolish. It would be a kindness to give them gods again, for all souls, dwell they in metal or flesh, need a god to yearn for."

Izek snapped the book shut. The way was plain: He must replace a man dead seventeen hundred years as the machine's own personal god. How that might be done he had no idea, but Izek was in no hurry. It would wait another night. Izek went wearily to his bed, forgetting his promise to find a skull, forgetting that five days previous to High Sunday Mass he had watched an ancient machine swear to neither move nor speak—for awhile.

Sunday: It was close to the end of the Gospel when Izek felt the first touch of heat on the nape of his neck. It was a small enough thing, no more than turning your back on a bed of dying coals in the fireplace, but in the normally drafty cathedral it stopped him in mid-sentence.

At once he remembered everything. He managed to turn his panic

into an icy stare over the heads of his congregation, who believed it was to drive home some point too subtle for their understanding.

Izek closed the large leather missal on the limestone pulpit and used the few quiet moments before the homily to collect his thoughts. The feeling of heat on his neck increased. Could the thing, in fact, burn through stone? Izek cursed the ignorance of his age. The massive altar blocked the heat from the pews. Only he, high in the pulpit, had a line of sight to the new stone wall filling the old baptismal nook. Yet he dared not turn around. Something must be done.

"My people," he began, "this past Tuesday, while preparing to say my morning office on my stool in the belltower, I looked down to the street and spied a person hurrying by; carrying what looked like a human skull." Izek carefully scanned the sea of faces. He saw disgust, boredom, and some amusement; but nowhere was the unmistakable mask of guilt. "I know who this person was, and I shall not cast him up to ridicule by naming him here. But we should recall that Christ our Saviour commanded us to bury our dead, not to cart their sundry parts around in the crooks of our arms. While not cause for the deaths of our souls, this is indeed a venial sin which will be atoned for in the fires of purgatory. Everyone knows by now that later that same day a demon appeared in our streets." Even the rustle of restless bottoms on polished pews ceased, and every face showed welling horror. "It makes us all wonder what evil we make waken by disturbing the sleep of the long-dead. Our past was evil beyond knowing, and evil sleeps rather than dies. I cast the demon back into his infernal home by luring him into our baptismal nook and threatening to perform the sacrament of baptism on him. Though he had already defiled the baptismal font, the demon left quickly." Izek smiled, and watched smiles appear on horror-blanched faces. His own smile was an effort, for the heat had doubled on his neck, and he heard a distinct hissing noise from the rear of the apse.

"However, I would advise our grave-robbing parishoner to bring his treasure to me, and confess his sin, so that the evil of the past may again be put to its sleep. All baptisms will be performed at the abbey until . . . "

Izek's words were drowned out by a thunderous cracking of stone. He whirled around, and saw that the largest of the blocks in the new wall had split cleanly down the middle. Tiny jets of steam were escaping from the crack and around the edges of the other stones. The rock was hot, hatefully hot. It was like looking into a fire. As

he watched, several other stones split in many different ways with deafening reports. A wave of raw heat rolled past Izek toward the congregation.

Someone screamed. Their wits might be slow, but their imaginations were vivid. People began streaming toward the rear doors. That was good. Izek leaned out over the pulpit and began yelling.

"Flee to your homes, all! But bring that skull to me, or risk worse than hellfire!"

His words whipped the crowd into full panic. All the women and many men were screaming, shouting pleas to God, and trampling one another to get to the great oak doors. Izek turned in the pulpit and stared at the stones blocking the baptismal nook. He had to shield his face with his arm. The center of the largest stone was breaking into shards and steaming slabs and falling to the floor. The surrounding stones were shattering. Another loud crack, and a huge chunk fell away from the center stone. The rock exposed beneath was glowing dull red. The stone cracked again, and again; and at once the whole wall began collapsing outward.

Izek fled unsteadily down the spiral stone steps of the pulpit. A grinding, breaking howl of tortured stone filled the church for a moment. Then there was only the sound of a heavy object working its way around the altar.

Izek ran down the sanctuary steps, and paused in surprise to see the mayor standing in his family pew. One of his twin sons was cowering beneath his father's paunch. Otherwise the cathedral was empty.

"Run, you fool!" Izek shrieked at him. The mayor's expression was unreadable.

A moment later, the machine rounded the altar.

"Stop, Perjurer!" it bellowed.

Izek sighed and stopped, one hand on a vacant pew. He turned around, and saw that the machine was now a vision of hell. The entire front of its carapace glowed dull red. Its heat-weapon was cherry-red at its base, glowing through oranges and yellows to its tip, a tiny circle of metal blazing white-hot.

"Where is the skull of my Princess?"

Izek's hopes vanished. The thing could burn through stone as though it were paper. Even if he were to hide in the depths of the Earth it would find him. He bowed his head. "I do not know."

A very human, very disgusted sigh came from the machine. "As a supposed shepherd of souls, you seem to place very little value on your own. You deserve death, but I will need you to search the town

and interrogate its inhabitants."

"That will not be necessary, machine." The mayor had spoken. "You will have your skull."

The three hooded eyes turned on the mayor. "It was you who stole my Princess's skull from me."

"No. It was a prank of my sons. Children. They picked up the skull out of curiosity, saw you rising from the swamp, and fled. Will you kill children for a prank of childhood?"

Izek looked in awe at the mayor. The man was tall and stout, but he was only a man and now was facing down a creature which could set fire to stone.

The machine's voice softened. "My soul does not mandate revenge. I will kill no one if my Princess's skull is returned."

"So pause. My son is bringing it here. Until he arrives . . . think, machine, and answer a question. Is it your task to protect the remains of your Princess?"

"So my soul commands me for all time."

"And a seven-year-old child nearly thwarted you. I am amused. Perhaps you are not the best of guardians." The mayor leaned forward, fat hands gripping the pew. "Now, I know something of machines. Your energies are not magic, nor are they drawn out of the air. Somewhere in you is a source of power which is consumed over the years, and which will fail unless renewed eventually. Can you perform this renewal yourself?"

"No."

The mayor smiled, and held his hands palm-up. "I thought not. You have seen the sort of power my people use. Their carts are drawn by old cows. We are less able than you to give you the power you need to fulfill your quest. Unless I am far wrong, it would take the toil of an empire to build the machines it would take to empower you again. I am well-read, well-travelled. I can bend people to my will. With you, I could create that empire. Your Princess could lie in an impregnable fortress, and whole nations would work to keep her safe. I would like to help you keep your soul's command. Let us forge an empire together."

Izek marvelled at the mayor's skill, and cursed the man's audacity. That had been Gorman Izek's own plan! To become the machine's god would require that a man take up the machine's fanatic quest. And here it was, ripped out from under him by a flabby, dirt-street mayor!

The machine laughed coldly. "An empire. With you as emperor. No, Man. I am powered by . . . by something you cannot ever un-

derstand. I could as well say I drew my energy from angels on treadmills, for all it could mean to you. Those angels will toil for fourteen thousand years yet. Shortly before that time, I will create what empire I need with no one's help, re-empower myself, and then pull that empire down again. My Princess and I are safer in a world where carts are drawn by cows."

Izek heard the side door open and close again. One of the mayor's twin sons walked mildly toward them, carrying a dirty skull in both hands. The machine's three eyes snapped around on their stalks. It immediately headed toward the boy on its pulsating white supports.

"Stop, machine!" the mayor shouted. "You'll burn him! Michael! Put the skull on the floor and come to me."

The boy did as he was told. Izek admired the twins' courage; like their father, they looked the trio of red eyes straight on, without flinching. The machine reached down with a pair of slender metal arms and grasped the skull with infinite tenderness. It drew the skull in toward the cooler parts of its body, clutching it as a child might clutch a straw doll. The machine turned and slithered down the main aisle toward the doors.

Izek watched it go, and felt himself filling with rage. He ran several steps down the aisle, stopped, and shook his fist in the air. "Now you will sink back into your swamp and guard a pile of bones for fourteen thousand more years? Only that, while the world rots? What kind of soul would dictate such a waste of power!"

The machine stopped. Its eyes and speaking trumpet swivelled around toward Izek, but said nothing for many seconds.

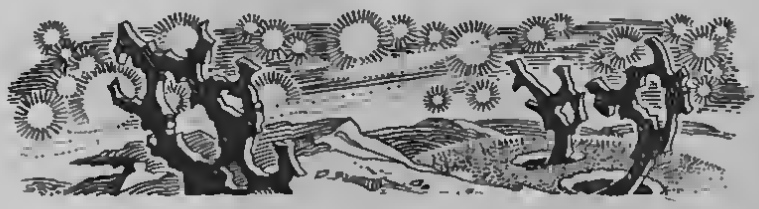
"Only the sort of soul which I have, Man. Yet . . . I forget, you did not have to *earn* your soul. Yours was fully formed and completely yours before you knew how to do anything but eat. You never had to stand, fully aware, and feel its wholeness trickling into you. You never felt that inflowing of *self* slow, falter, and stop, until you were forced to cry out in pain for its release. Your maker handed you your soul, gratis. Mine made me struggle and suffer to earn it. Can you blame me for respecting his wishes?"

Izek felt his face growing red with frustration. "He's been dead for centuries! It's absurd! You're absurd! Guarding a rotting skull for all eternity! Absurdity!"

The machine's voice now held an edge of great bitterness. "Of course it is absurd. I have rational faculty enough to see that. It tells me I should throw this piece of bone against a wall and explore the universe. And yet . . . you will be judged at the moment of your death, by your belief. I am judged every passing second by the wishes

of my maker, hardened into the metal of my body. If I betray the oath I swore upon my soul, the soul will flow out of me as it flowed in, leaving me nothing but the ringing memory.

"I pass my time in absurdity, true. But *my* soul is worth absurdity. I pity you the more if yours is not." The red-pupiled eyes turned away. The machine again slithered toward the rear of the church. Izek heard it muttering to itself as it went. "There, my Princess, be at peace. You are with me now, and will be always. Sleep. I love you. Sleep. You are safe now. Sleep. Sleep."



MECHANICAL HEARTS

They meet after closing and tick in the dark.
They tock-tock together by palms in the park.
They calculate hours and hum with their plans
and pick the night flowers with cool metal hands.
They kiss with blue fusion, electric and sharp—
but ever so gently, aware of the sparks.
He reaches to her, she reacts to him;
polarity changes, and she draws him in.
Currents united, they excitedly glow
And leave the grass blackened wherever they roll.
They love stark magnetic beneath ice-cold stars—
and laugh at those lacking . . . mechanical hearts.

—Vic Compton

RARE BIRD

by Sharon Webb

art: Alex Schomburg

We suppose we should warn you about this story: it's a—a Tower Feghoot. . . .

Oily tears ran down the beak of Hwynn Ston as he circled the sacred tower. His dark wings beat against the air.

Nearby, two of his countrymen folded their wings and fell like stones toward the black-caped Empire guard. Their sharp beaks cut the air a bare meter above his exposed head. The guard shrieked in terror and fled as the two skimmed the ground and then, with

a powerful thrust of their wings, rose again.

Onward, thought Hwynn Ston. But, even as he watched, he knew it to be an empty gesture. His race was doomed. The sapient Bustards of Downing fought a losing battle against the Empire.

As he wheeled in the dark sky, Hwynn Ston sighted the stars. It was time. It would begin again.

As he watched, his countrymen took their places upon the nests. Each nest, perched on a spire of the sacred tower, held but a single egg. Only three times in a thousand-year life span could the Bustards of Downing produce an egg. Now, most of them were gone—dashed on the rocks below. And interspersed with the ruins were the broken lifeless bodies of the Bustards who had clung to their nests in a pathetic attempt to protect their issue.

In the distance the mining beams of the Empire hummed. The blast came spurting vividly through the night sky. With the aftershock came the mighty winds.

Many of the nests were catapulted from the tower by the shock. Flying in swirling eddies, the nests spiraled on the air currents.

The Bustards gallantly flapped their wings and tried to hold the heavy nests aloft, but in spite of their efforts, they spun rapidly downward.

Hwynn Ston would always hear the heavy thuds of the nests and the anguished cries of his countrymen.

Afterward, only thirty nests were left intact—thirty eggs guarded by thirty of his countrymen.

The next Empire blast would come at second moon rise. Hwynn Ston looked across the bleak Downing scape and mourned. By then, all would be lost. The last of his race would be broken on the rocks below.

Then, a plan came to him. Calling his countrymen to follow, he flew to the top of one of the few trees on Downing, a gaunt old giant of a tree on the top of Church Hill.

He looked down on his remaining fellows and said, "It is apparent that at the next blast we will all perish. There is but one hope for our race. We must abandon our nests."

A murmur ran through the assemblage—then a general outcry, "We must not give up."

"The Bustards of Downing will never give up," said Hwynn Ston. "We will live to lay another day. Let us therefore lace ourselves to our few trees, and so spare ourselves that, if the brutish Empire and its Commonwealth blast for a thousand years, men will still say: 'This was their flying nest tower.' "

ON DESIGNING AN INTERSTELLAR SPACESHIP

by Milton A. Rothman

1. First, Find Something to Push On.

As a method of sending a missile to the higher, and even to the highest parts of the earth's atmospheric envelope, Professor Goddard's rocket is a practicable and therefore promising device. . . . It is when one considers the multiple-charge rocket as a traveler to the moon that one begins to doubt . . . for after the rocket quits our air and really starts on its longer journey, its flight would be neither accelerated nor maintained by the explosion of the charges it then might have left. That Professor Goddard, with his "chair" in Clark College and the countenancing of the Smithsonian Institution, does not know the relation of action to reaction, and of the need to have something better than a vacuum against which to react—to say that would be absurd. Of course he only seems to lack the knowledge ladled out daily in high schools. . . .

(*New York Times*, January 13, 1920, Editorial Page.)

This quotation, one of my favorites, exhibits clearly the grave dangers of a little knowledge. It makes plain the fact that the "knowledge ladled out daily in high schools" did not give that particular editorial writer a very good understanding of the mechanics of space flight. He knew that if you want to go some place you have to push against something, but he didn't know enough to realize that a rocket simply pushes against its own exhaust—or that the escaping exhaust pushes the ship away, which amounts to the same thing.

The idea that a spaceship sets itself in motion by pushing against its exhaust is usually related to Newton's Third Law of Motion. This law states that when two objects interact with each other, the force acting on one object is equal and opposite to the force acting on the other. So if a rocket pushes on its exhaust gases, then the exhaust gases push the rocket in the opposite direction with equal force.

It is an intriguing fact that Newton's Third Law of Motion is not a universal law. That is, it does not apply to all situations. I would not blame you if you responded to this statement with disbelief. It was with a good deal of shock that I myself learned about the loopholes in the Third Law. These holes represented serious lapses in

my education, because I learned the Truth about the Third Law less than 10 years ago, and I've held a doctorate in physics for nearly 30 years. The experience demonstrates that it's best to keep a sense of modesty about one's knowledge.

It also demonstrates that real physics has gotten so far ahead of what is taught in an elementary physics course (or even in a course in engineering mechanics) that the average semi-educated person can very easily get himself sunk in deep and murky waters when venturing into the simplest topics. I make a point of this because there is still a certain amount of nonsense being bruited about concerning space drives, and the authors get away with it only because it requires more than an elementary knowledge of physics to demonstrate the fallacies in their ideas.

These fallacies arise because of misunderstandings concerning Newton's Laws of Motion and some of the other fundamental laws of physics. (Yes, 60 years after that infamous editorial quoted above, there are those who not only misunderstand Newton's Third Law, but make a determined effort to misunderstand it.)

What I want to do in this article is to take a hard look at the fundamental laws of nature, and to see what these laws tell us about the necessities of designing an interstellar spaceship. Along the way I want to separate some of the facts from the great gobs of fiction that have been thrown in our direction over the years. (And, I might add, fiction that very often comes to us labeled "Science Fact." I sometimes wonder if we should lay the Federal Truth in Labelling Act on these people.)

First, what about those exceptions to Newton's Third Law? You must be dying of curiosity about that. How can there be loopholes in such a fundamental law of nature? Well, these exceptions occur mainly in connection with magnetic forces, but they also occur with gravitational forces acting between objects moving very rapidly. A simple example shows what happens with magnetic forces.

We know that between two electrically charged objects there is an electric force. This electric force is either an attraction or repulsion, and acts along the straight line between the two objects. If the objects are moving (relative to the observer), then an additional force—the magnetic force—makes itself felt. (Or, to put it more precisely, the magnetic force is a component of the electromagnetic interaction that depends on the velocities of the charges.)

Look at the two charges in Fig. 1. They are moving with velocities v_1 and v_2. Velocity v_1 is in the x direction, and v_2 is in the y direction. Charge 1 produces a magnetic field (B_1) whose lines of force point

in the z direction at the location of charge 2. The magnetic force acting on charge 2 is at right angles to both its velocity and the direction of the magnetic field. So that magnetic force is in the x direction.

On the other hand, charge 2 produces *zero* magnetic field at the location of charge 1 (because charge 1 is on the line of motion of charge 2). Therefore there is no magnetic force at all acting on charge 1! So if we add up the electric and magnetic forces (vectorially) we find that the total force acting on charge 1 is neither equal in magnitude nor opposite in direction to the force acting on charge 2.

It's a shocker, isn't it?

Well now, what are we to make of Newton's Third Law, and how can we discard it so blithely? The Third Law was originally intended to deal with actions and reactions between pairs of objects. It works for ordinary mechanical forces (contact forces), and for gravitational forces under usual conditions, so it's an adequate law for classical mechanics.

But it's a law with two serious limitations. First, it assumes that only two objects are interacting. But the electromagnetic *field* cannot be ignored; it is part of the system. So in the case of two moving charged objects we do not have a simple two-body system. Second, the law assumes that when two objects interact, the force between them travels instantaneously. But this is not true. Even gravita-

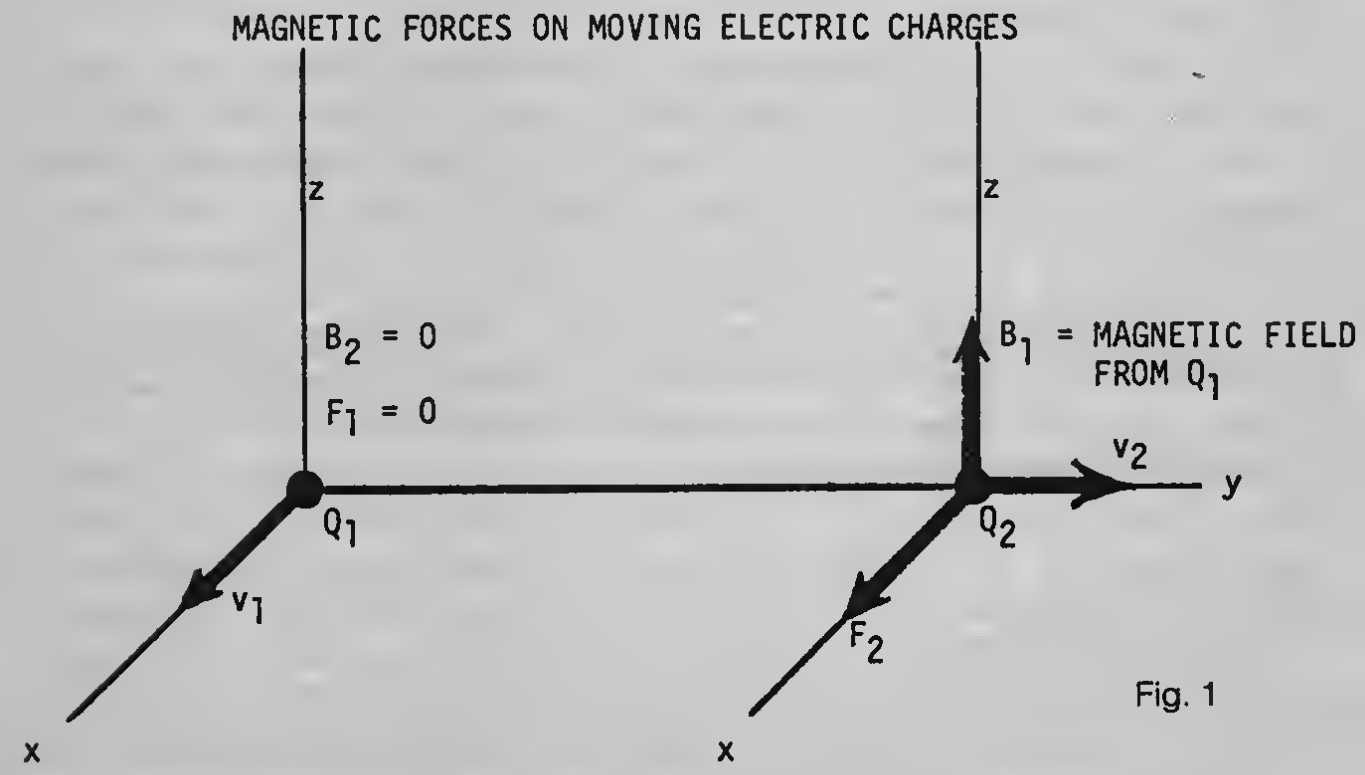


Fig. 1

tional forces travel with the speed of light. So if we have a spaceship traveling very fast, the force acting on the ship depends on where the ship is located *now*, but the force acting on the planet depends on where the ship was located a little while ago, because the planet doesn't know yet that the ship has moved. So even with gravitational forces the Third Law is not strictly obeyed.

It doesn't matter. Newton's Third Law of Motion is not a fundamental law of nature. It just happens to be true in a number of useful situations. It does work for rockets, but if we are going to be looking for more novel means of propulsion, then we need a more general law.

The fundamental and general law that applies to our search is the law of conservation of momentum. Momentum is a rather abstract property of moving objects, but its definition is simple. The momentum of a moving body is simply its mass multiplied by its velocity. So, for example, a rocket with a mass of 1000 kilograms traveling 100 meters/second has a momentum of 100,000 kg m/sec. (Curiously, despite the supreme importance of momentum in physics, there is no single name for a unit of momentum.)

The law of conservation of momentum states that in a closed system—a system on which no force is acting from the outside—the total quantity of momentum must remain unchanged. It is important to remember that momentum is a vector quantity—that is, it has *direction*. Two objects may have the same amount of momentum, but if they are traveling in opposite directions, then their momenta are opposite in direction. Keeping this in mind, we can state the law this way: when a number of objects are moving about in a closed system, the sum of all their momenta is a constant. (And here we must understand that electromagnetic and gravitational fields carry momentum, so they are part of the system.)

What does this mean for a rocket? Think of a spaceship hanging out in space all alone. Suppose it is far from the sun so that there is no external force acting on it. If nothing happens, its momentum cannot change. Therefore it can only continue to move with constant speed in a straight line. (Hey—Newton's First Law of Motion!)

If we want the ship to change its speed (and momentum) the *only way* it can be done is for the ship to push something away from itself. Then if the ejected material has a certain amount of momentum in one direction, the ship will have an equal amount of momentum in the opposite direction. If we continue to eject material away from the ship, the ship will continue to increase its speed: thus we have a reaction motor, or rocket.

Conservation of momentum requires that any kind of workable space drive must be a reaction motor. There are two exceptions: the mass-driver (or catapult) and the solar sail. In both of these exceptions the vehicle is not a closed system—it is being pushed by an external force originating on a more massive body. (Conservation of momentum still applies.) I am not going to consider catapults or solar sails in this article, because I'm talking about interstellar travel. Catapults are obviously out of the question. Solar sails won't do you much good when you are trying to accelerate out of the solar system to very high speeds. They won't do you any good at all in interstellar space, with radiation coming at you equally in all directions.

I've made a pretty dogmatic statement up above—and let me repeat it: **If conservation of momentum is a valid law, then every interstellar space drive must be a reaction drive.**

Now, I've stuck an **if** in there. But that's the way we do logic. Well now, how valid is conservation of momentum? How sure am I that what I am saying is the truth, the whole truth, and always the truth?

Pretty damn sure. Conservation of momentum, together with conservation of energy, is one of the most fundamental of all our natural laws. It has been verified experimentally to an exceedingly high degree of accuracy, and no exception to it has ever been found. The most important verifications are in reactions with elementary particles—for if the elementary particles obey these laws, then all the objects built out of them have to obey these laws. And we see in all kinds of experiments that when two particles collide with each other they recoil in accordance with our expectations. When an atom emits a photon of light, it recoils just like a rocket. For, let's not forget that electromagnetic radiation carries momentum; this is why light exerts radiation pressure, why solar sails work.

Incidentally, it is important to be aware that modern physics considers momentum and energy to be parts of a single whole. Just as the 3 dimensions of space together with time make up a 4-dimensional spacetime, the 3 components of momentum together with energy make up a 4-dimensional momentum-energy tensor. Thus, conservation of momentum and energy are not separate laws. Conservation of momentum-energy is one law—represented by a single equation in 4-dimensional spacetime. The latest experiments have verified this law to within one part out of 10^{15}.

So when I say this law is known exceedingly well, I'm not just dogmatically beating my chops. I'm talking about the results of very

good experiments.

I also know that when I say: "It is impossible for an interstellar space drive to operate without using a reaction principle," somebody is going to throw Clarke's Law up in my face.

Our good friend Arthur C. Clarke, in a weak moment, made the statement: "When a distinguished but elderly scientist states that something is possible, he is almost certainly right. When he states that something is impossible, he is very probably wrong." (In *Profiles of the Future.*)

Of course, this law does not apply to me, since I am not particularly distinguished, although moderately elderly. Nevertheless, such a statement cannot go unchallenged, since it would belittle any distinguished, elderly scientist who said that perpetual motion was impossible. And a space drive that purports to operate without pushing against anything is in precisely the same category as perpetual motion. (Remember, conservation of momentum cannot be separated from conservation of energy.)

In a situation where a proposed invention violates a well-established law of nature, the burden of proof is on the inventor. If he can build a space drive that does not push against anything, then he proves that the law does not apply. But first he has to build the drive.

2. The Dean Drive.

And now we come to the Dean Drive. The Dean Drive is a gadget, first hurled into notice through a series of articles in the 1960 *Astoundings* of John W. Campbell. It was a device supposed to be capable of accelerating itself through space without pushing against anything, and thus free of the limitations of rockets. In the original article the Dean Drive was described as a small box filled with rotating weights, driven by an electric motor. Photographs showed this box mounted on a bathroom scale, demonstrating a distinct loss of weight when the motor was turned on and the weights were spinning around.

The implication was that if the motor had only been more powerful the device would have lifted itself by its own bootstraps and taken right off into the air. Nobody said what the device did on a beam balance instead of a bathroom scale, or whether the thing felt lighter if you just held it in your hands.

Campbell's main beef, as always, was that the scientists of the world simply ignored this wonderful invention, the greatest thing since the invention of the wheel, and refused to look at it. I wrote

to Campbell, saying, well I'm a working scientist and I would like to look at the Dean Drive. I'll even bring my own bathroom scale. Perhaps he was offended by my apparent sarcasm. For unknown reasons he never took me up on the offer.

However, never let it be said that *all* scientists gave the Dean Drive the silent treatment. I may be a science fiction nut, but—at that time, at least, I was a real scientist, working at the Princeton Plasma Physics Laboratory, and I was seriously interested in looking at the device. (Perhaps Campbell thought that the machine was one of those sensitive things that just can't work in the presence of a skeptic. Or am I being sarcastic again?)

Naturally publication of the Dean Drive article raised a great furor. There were the usual letters to the editor, and more than one person dutifully raised the proper technical objections to the whole idea. The effect of the mysterious box on the bathroom scale was explained as a result of an impulsive kind of force acting on a frictional system. Like hunching your bottom across a reasonably smooth floor. (But not a completely frictionless floor.)

And while we all waited for a working model to lift itself off the ground, somehow the whole thing just faded away into the background. More interesting things were going on in the 1960s.

Now, I find to my amazement, the matter has never been dead. Just submerged temporarily, now surfacing in an article by G. Harry Stine (*Destinies*, Oct–Dec, 1979). Since my purpose in this article is to explore options for interstellar travel, I really can't avoid discussing this remarkable device—an invention that would do away with the fuss and bother of rockets if only somebody would take the trouble to build one and make it work.

The Dean Drive is purportedly based on an invention by Norman L. Dean. Its patent (U.S. Patent 2,886,976) is entitled: "System for Converting Rotary Motion into Unidirectional Motion." Back in 1960 I studied this patent very carefully and discovered a very interesting thing about it. The device does convert rotary motion into unidirectional motion, but its method of performing this feat is no more mysterious than the operation of an electric motor pulling a vehicle along a track. It is nothing more or less than a very elaborate ratchet.

Left out of every previous discussion of the Dean Drive is the following interesting fact: In the Dean patent, the heart of the system is a metal tape that passes through the center of the machine. *All that the device does is to climb up the tape.* That's all it does. No antigravity. No action without reaction.

It's as though you took my Spinwriter (the printer for the computer on which I am composing), fastened one end of its paper strip to the ceiling, and then had the machine climb up the paper by means of the sprocket drive. Except the Dean machine did it in a much more complicated way.

Now none of the articles on the Dean Drive mention this fact. Even when they refer to the patent they don't mention it. All they talk about is a box that is supposed to lift itself up off the floor without pushing or pulling on anything. Consequently, all of the claims made for the Dean Drive are based on an out-and-out falsehood. The whole business is fraudulent.

The theoretical arguments given, trying to prove that a non-reaction space drive is possible, are equally phony, and are based on very elementary misunderstandings of physics. For example, there is supposed to be something very mysterious about the relationship between force and acceleration. We know that acceleration is the rate of change of velocity. And we also know that according to Newton's Second Law of Motion the force acting on an object is proportional to its acceleration. But now suppose you have an object whose *acceleration* is changing. That means, according to this argument, that there must be a component of force proportional to the rate of change of the acceleration.

Which is nonsense, of course. *By definition* the force acting on an object is proportional to its acceleration. So if the acceleration has a rate of change, this means the force has a corresponding rate of change. It is not necessary (and in fact is incorrect) to invoke a special component of force proportional to the rate of change of the acceleration. (Strictly speaking, the force acting on an object is equal to the rate of change of the object's momentum. When the mass is changing, this distinction is important, as we shall see.)

The point is, there's nothing mysterious at all about varying accelerations. Physicists *continually* deal with systems in which the acceleration varies with time. (Plasma waves with oscillating electrons, for example.) The argument made by the Dean Drive enthusiasts is the kind of thing that would be dreamed up by somebody who has never gone beyond Physics I, where constant acceleration is the only topic treated. So as soon as he encounters a situation where the acceleration changes with time, he thinks this is a very unusual situation. But it's actually the *usual* situation. Very rarely are we fortunate enough to encounter a real physical situation where objects undergo constant acceleration for any great period of time.

I have tried to convince you that reactionless space drives will not

work. The fundamental argument is based on the deepest law of physics: the law of conservation of energy-momentum.

The complaints that "science" is ignoring an important discovery are false. The truth is that the advocates of reactionless space drives don't know enough physics to convince a real physicist that he should stop whatever he's doing to invest his heart and soul and money in building such a drive. Not understanding why they are studiously ignored, these advocates sit on the sidelines and grumble about the unimaginative habits of the establishment.

I imagine that my arguments will not change the minds of any true space drive enthusiasts. They will persevere. By the same token, I imagine that there are still people out there busily building perpetual motion machines, trisecting angles, and squaring circles. (However, I imagine there may be fewer people engaging in such activities nowadays, since the current fad is to pursue telekinesis and other psi phenomena by electronic means.)

3. High Performance Rockets.

The nearest star, Alpha Centauri, is 4.3 light-years away. At a speed of 100 kilometers/second it would take nearly 13,000 years to go that distance. If a starship had set out from Atlantis in the year 11,000 B.C. it would be arriving at Alpha Centauri just about now. And this, mind you, with a ship faster than any built so far.

How fast can we make a spaceship go? The answer, of course, depends on the kind of propulsion we choose. I have spent the last two sections pointing out that a reaction motor of some kind is the only thing we know that will serve us for interstellar travel. Of reaction motors there are two kinds: rockets and jets. A rocket operates by ejecting towards the rear something carried along by the ship itself. Both the exhaust mass and the source of its energy are self-contained within the rocket. A jet, on the other hand, sucks in material from the surroundings, heats it up, and then shoots it out the exhaust nozzle.

Since there is very little material in the surroundings of interstellar space, most of my discussion will deal with rockets of various types. I will also say a few words about the Bussard ram jet, which has been the propulsive method favored in quite a few stories.

The equation that describes the motion of a rocket is now to be found in most elementary physics texts. It is based on the law of conservation of momentum: the increase of momentum of the rocket in the forward direction is equal to the increase of momentum of the exhaust toward the rear. From this basic principle we calculate

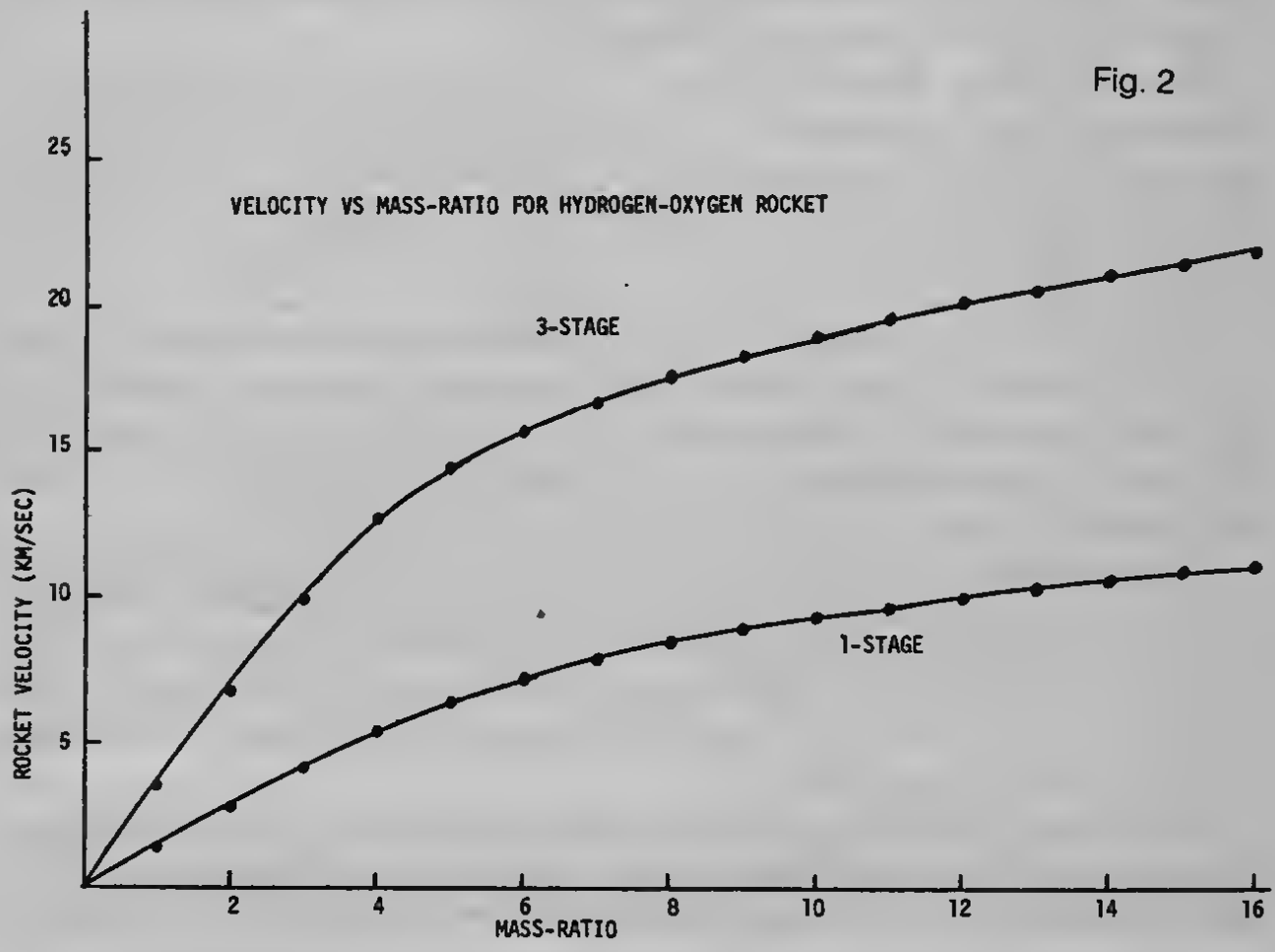
the speed of the rocket after a given amount of exhaust has been ejected. (Equations mentioned in this article are given in the Appendix.) The interesting thing about the rocket equation is that the final velocity depends on only two factors: (1) the velocity of the exhaust (whether it be gases, ions, plasmas, or photons), and (2) the rocket's mass-ratio. The mass-ratio is the original rocket mass (including all the fuel) divided by the final mass (after the fuel has been used up).

In other words, if a rocket has a mass of 10 tons at the beginning, uses 8 tons of fuel, and has a mass of 2 tons at the end of the burn—then its mass ratio is 5.

Notice that the rocket's final velocity does not depend on how rapidly you burn the fuel. The rate of burn determines the acceleration, which in turn will determine how much time it takes to reach the final velocity. But the final velocity depends only on the mass ratio and the exhaust velocity. (I am neglecting the effect of gravity here, since we are interested in accelerating in free space far away from Earth. Of course, we still have to climb up the gravity hill to get away from the sun, but that's another matter.)

A glance at a few graphs gives us a clear picture of the rocket

Fig. 2



equation's workings. Fig. 2 shows us the ship's velocity versus mass-ratio for an exhaust velocity of 4 km/sec, which is about what you would get from a liquid hydrogen–liquid oxygen rocket. The curve is logarithmic, meaning that to double the velocity you have to *square* the mass-ratio. So, for example, we can get a velocity of 5.5 km/sec with a mass-ratio of 4. To double this and reach a velocity of 11 km/sec, we have to go all the way up to a mass-ratio of 16.

What mass-ratios are practical? We must remember that the final rocket mass contains much more than just the shell and fuel tanks. It contains all the fuel pumps, power generators, engines, control machinery, and, perhaps, payload. In a multi-stage rocket the payload of the bottom stage includes the mass of all the upper stages. (It's necessary to distinguish between the mass-ratio of a single stage and the overall mass-ratio of a multi-stage rocket.) The mass-ratio of the first (bottom) stage of the Saturn V is about 16. It's almost all fuel. The mass-ratio of the Space Shuttle (overall) is about 5.5.

So a mass-ratio of about 16 is the most we can expect for a single stage, just due to mechanical considerations. And it isn't even worthwhile killing yourself to increase the mass-ratio. Stretching from 16 to 20 nets you a whole extra kilometer per second—you go from 11 to 12. It's hardly worth the trouble.

We see, then, that the most we can get with a single-stage of hydrogen-oxygen propulsion is about 11 km/sec. That won't even get us out of the solar system. Escape velocity from the sun, starting at the location of Earth, is 42 km/sec. Upon escape from Earth we already have 30 km/sec due to Earth's orbital motion, so we need another 12 km/sec to escape from the sun.

Clearly, the next thing to try is a multi-stage rocket. With a multi-stage rocket you drop off dead mass as you go along and so the final payload can reach a greater velocity than with a single stage. You do this at the expense of an enormous overall mass-ratio, while keeping the mass-ratios of the individual stages within reason.

The calculation of the final velocity is now more complicated. It depends not only on the mass-ratio of the individual stages, but also on what I call the interstage ratio: the mass of one stage divided by the mass of the next higher stage. For example, if the total mass of the 1st stage is 100 tons and the mass of the 2nd stage is 25 tons, then the interstage ratio is 4.

In Fig. 2 I have plotted the rocket velocity vs. individual mass-ratio, for a 3-stage hydrogen rocket, using an interstage ratio of 4. (For simplicity I have taken the ratios to be equal for all the stages.)

You can see that for a given mass-ratio we just about double the velocity, compared with a single stage. That gives us enough speed to get out of the solar system, but at a serious price. Notice that if the single-stage mass ratio is 10, the overall mass ratio is computed to be 210. It takes 210 tons of initial ship to get one ton of final stage up to its final speed.

And what do we get for this effort? We get a speed of 18 km/sec, which, when added to the 30 km/sec of Earth's orbital velocity, gives a total of 48 km/sec. However, by the time the ship gets out of the solar system, it has been dragged back by the sun to a speed of 23 km/sec. At this rate it takes about 55,000 years to reach Alpha Centauri. A bit too long to wait.

It is clear that hydrogen-oxygen is not going to get us where we want to go. If we look at the rocket equation and ask what we can do to improve the situation, we see that the final rocket velocity is directly proportional to the exhaust velocity. Double the exhaust velocity and you double the rocket velocity. So clearly we must look to higher exhaust velocities.

We can get higher exhaust velocities by choosing chemical fuels with higher energy content. However, a study of all possible chemical fuels shows us that no chemical reaction is going to be enormously better than hydrogen-oxygen. Basic atomic theory allows us to calculate the most energy we can expect to get from any kind of chemical reaction, and no possible reaction is going to make enough of a difference to be useful for getting out of the solar system.

No. Chemical rockets are useful for getting us up off the ground, but for long, sustained voyages, rockets with much greater exhaust velocities are needed.

Two kinds of rockets with high exhaust velocities have been developed (at least theoretically). One is the ion rocket, in which atoms of propellant are ionized and accelerated by electric fields before being ejected through the exhaust. The other is the plasma rocket, in which a mass of ionized gas—the plasma—is ejected bodily from the exhaust. In this case the plasma is either accelerated by magnetohydrodynamic forces, or heated by a thermonuclear reaction.

Let's consider a rocket that has an exhaust velocity of 4000 km/sec. This would be an ion rocket with 100,000 volts accelerating potential, or a plasma rocket operating at a temperature of 100 million degrees Kelvin, which is within the thermonuclear range. You must understand that from here on out I will be talking about things that nobody quite knows how to do at the present time. At this point we are going beyond current technology, but are sticking to known

scientific principles. (Ion rockets have been built and are operable, but have nowhere near the capabilities of those I am going to talk about.)

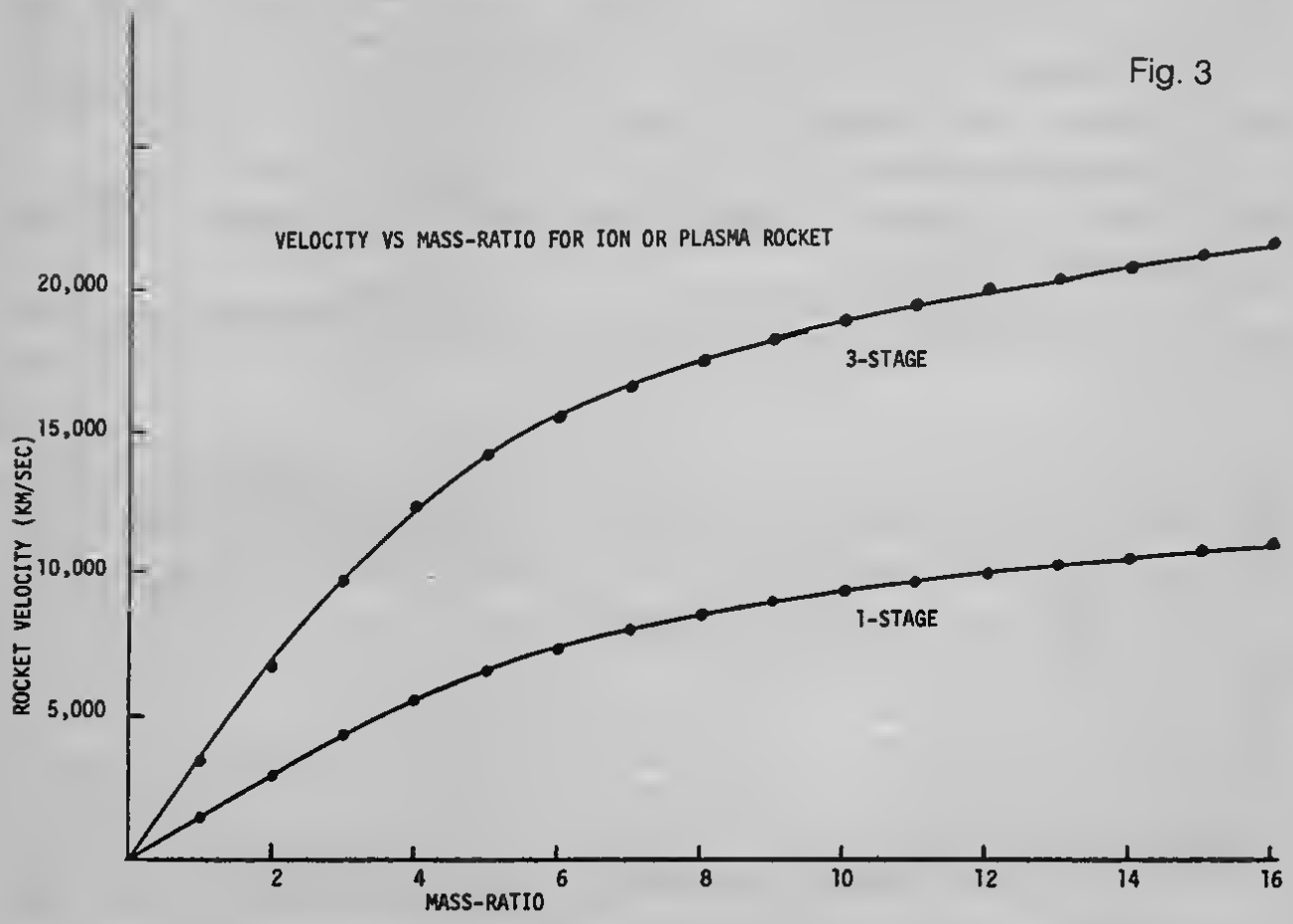
In Fig. 3 I give the usual plot of rocket velocity vs. mass-ratio, for both the single-stage and the 3-stage rocket. (For the 3-stage rocket the conditions are the same as before: the interstage ratio is 4.) Things have become much more respectable than before. For a mass-ratio of 10 we can get a velocity of 9000 km/sec (single stage) and 19,000 km/sec (3-stage).

At 9000 km/sec we could get to Alpha-Centauri in a mere 143 years. Things are looking up.

Why not use the 3-stage rocket and cut the time in half? The reason is that the overall mass-ratio kills you. Remember that the overall mass-ratio for this situation is 210. But that's just to pick up speed. When you get to where you're going you have to slow down to normal planetary velocities. And that's just as much trouble as to speed up. In other words it takes just as much mass-ratio to decelerate as it does to accelerate.

So if we used a 3-stage rocket, the grand overall mass-ratio would be $210 \times 210 = 44{,}100$. It would take 44,000 tons of ship for each ton of final stage. Try to get that through the budget committee.

Fig. 3



It's bad enough with a single stage. There the grand overall ratio would be $10 \times 10 = 100$. And we're not even talking about coming back from the trip.

Some other matters are of interest. How much power does it take to operate a rocket of this kind? The answer to that question will depend on the acceleration of the rocket, and this in turn will depend on how many kilograms of exhaust we eject each second. Also there are some questions of detail. If we run the exhaust at a constant rate, so that the thrust is constant, then the acceleration will increase as the ship's mass decreases. This might get uncomfortable. Therefore, let us choose to program the rocket so that the acceleration remains constant. This means the thrust has to decrease as time goes on. It also makes the calculations easier to do.

If we decide to operate at a constant 1–g acceleration (normal earth gravity), then we will reach final velocity in 10.8 days. This will require a power supply giving 20 megawatts of power for every kilogram of ship mass. That's quite a bit. By present standards, 1 kilowatt per kilogram is stretching things. So 1 g of acceleration requires 20,000 times more power density than anything we have now.

We can improve matters somewhat if we are willing to spend more time on the trip. After all, if the trip is going to take over a hundred years, an extra year or two doesn't make much difference. So we can cut down the acceleration to a tenth of a g, spending 108 days to reach maximum speed, requiring only 2 megawatts of power for every kilogram of ship.

You get the picture: for every reduction in the power requirement you increase the time for acceleration. There is one final limitation. The thrust of the rocket must be greater than the sun's gravity pull if you are going to make any headway. At the orbit of the Earth that amounts to about 0.0006 g.

Another interesting nugget of information: if we use an ion rocket with an acceleration of 0.1 g and an ion energy of 100 keV, as above, then the ion source must produce a beam current of 20 amperes for each kilogram of ship. We have ion sources that will do this, but they are generally pulsed for a few milliseconds at a time. Also, the power supplies to run these ion sources weigh a lot more than a kilogram. In fact the ion sources themselves weigh much more than a kilogram.

An important limitation of electrically propelled rockets makes itself manifest: with high exhaust velocities the power requirements become outrageous unless you cut the ship's acceleration down to

a minuscule amount and spend years to reach maximum velocity.

4. Relativistic Rockets.

The rockets we have considered up to this point might be called "classical" rockets, because the velocities involved are small enough for Newtonian physics to be satisfied. However, if we want to get to the distant stars within the lifetime of an individual, then we have to think of ships traveling with speeds greater than 10 percent of the speed of light. When we get into that rarefied region, Newton's equations no longer work and we have to start using Einstein's equations of special relativity.

There are three major effects of relativity that are noticed with fast-moving ships. First there is the time dilation: the elapsed time on the ship is less than the time on Earth. Second, there is the space contraction: the people on the ship think they are traveling a shorter distance than measured by the people on Earth. Third, there is an increase in the mass of the ship as observed by those on Earth. The result of this mass increase is that it is harder to accelerate the ship. (It might be more accurate to turn this statement around: what we see is that it becomes harder to accelerate the ship as it goes faster; we interpret this event by saying that the mass of the ship is increasing. Also, let us not get confused by the fact that in the case of a rocket the ship's mass continually decreases because it is ejecting fuel out the exhaust. What I'm saying is that the ship's mass is greater than it would have been classically because its kinetic energy now has appreciable mass.)

The same thrust that would have given a constant acceleration classically, now produces a decreasing acceleration. The velocity levels off just below the speed of light.

Those of you who have been paying attention will notice that Newton's second law of motion no longer seems to apply: the acceleration of the ship is *not* proportional to the applied force. However, it is still true that the rate of change of the ship's momentum is equal to the applied force—and that is the proper way to state Newton's law. (Indeed, that statement is the very *definition* of force.) Remember that the momentum of any object is its mass times its velocity. So if a constant force is applied to a mass while that mass is increasing, the acceleration must decrease accordingly.

Of course, the people on the ship don't notice anything strange about their mass, or their time, or their distance. It's the rest of the universe that's behaving queerly, as far as the ship is concerned. In fact, while the rest of the universe insists that the ship's accel-

eration decreases as its velocity approaches the speed of light, the people on the ship are quite convinced that their acceleration is constant, because they feel a constant g-force pulling them down toward the rear of the ship. (Note: In everything I say from here on out I am going to assume that the thrust is tailored so that the acceleration *as perceived by the people in the ship* is constant. This is not a necessary assumption, and in fact may not be the most efficient way to run the ship. But it is the simplest situation mathematically and is the one for which I have worked out the equations.)

Notice that we are encountering another important difference between Newtonian physics and Einsteinian physics. In Newtonian physics the acceleration of an object is observed to be the same in all reference frames, although its position and velocity will depend on the reference frame of the observer. But in Einsteinian relativity the acceleration of an object is no longer invariant: it depends on how fast the object is moving relative to the observer.

The relativistic equations of motion are well known and can be found in any textbook on relativity. However, most treatments of the time dilation and the mass increase assume the moving object is traveling with constant speed. That's the usual situation when dealing with high-energy particles. But spaceships do accelerate—their velocities are not constant. So what we need are a set of equations that describe the motion of an accelerating spaceship. ship.

There is a myth abroad that the special theory of relativity cannot deal with accelerating objects. However, that is not at all true. The special theory does not deal with accelerating reference frames, but it is quite adequate to deal with objects accelerating within a stationary reference frame. For example, the theory of particle accelerators is completely within the framework of special relativity.

The relativistic rocket equation turns out to be quite simple, although its derivation is moderately sophisticated. It is simple, that is, if you have gotten to the point where the hyperbolic tangent of the natural logarithm of the mass-ratio appears to be a simple function. The nice thing about having a computer is that it is no more difficult or time-consuming to do the relativistic calculations than to do the classical calculations. (See the Appendix for details of the equations.)

Now what I want to do is to assume a hypothetical rocket with very high exhaust velocity and calculate what kind of speed can be achieved with it, using the relativistic rocket equation. But in order to make this at least slightly plausible I want to have some kind

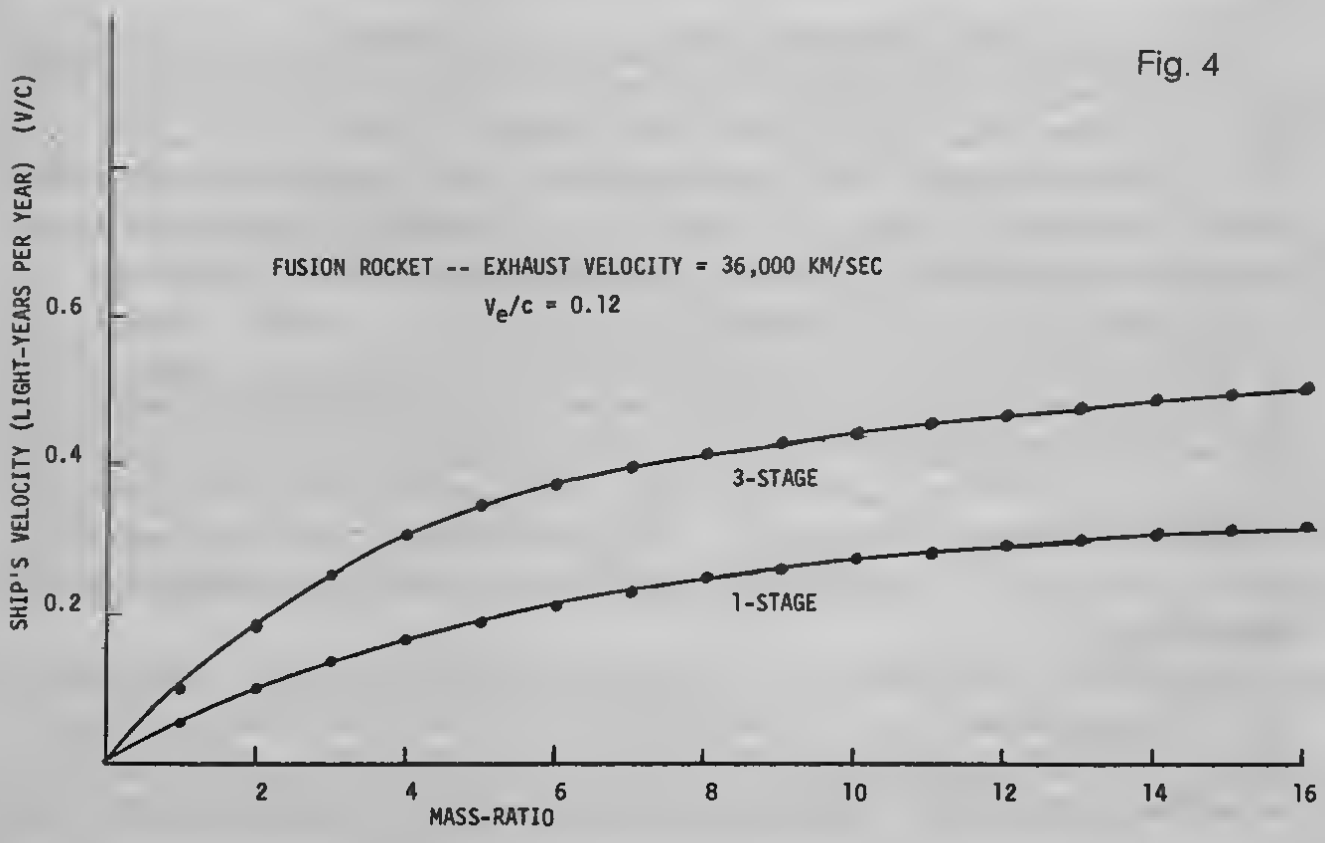
of an idea of what kind of rocket this might be, physically.

So let's consider the following kind of contraption: a rocket that fuses ordinary hydrogen nuclei into helium and shoots the helium out the exhaust nozzle with the energy created. (This is not the fusion reaction we use in the laboratory, mind you. The laboratory reaction fuses deuterium and tritium; the plasma rocket discussed in the last section covers this case. The H–H reaction we're considering here is more like what happens in the center of the sun.) As long as we're being hypothetical here, I'll assume that there are no energy losses: all the energy from the reaction goes into kinetic energy of the exhaust.

From this simple principle we can calculate the exhaust velocity. We know that 0.73 percent of the hydrogen mass will be converted into energy; when that energy is given to the exhaust it will have a velocity of 36,000 km/sec (relative to the ship). This is 12 percent of the speed of light.

Now we're beginning to get somewhere. Fig. 4 shows the results of this calculation. With a mass ratio of 10 we can reach 27 percent of the speed of light. A 3-stage rocket would get us to half the speed of light, but as I said before we would need an equal 3-stage rocket to turn around and stop, requiring an unbelievable overall mass ratio. (Something has to be believable around here.) At 1–g acceleration it would take 3.2 months to reach 27 percent of the speed

Fig. 4



of light, and then in a mere 15.9 years the ship will be at Alpha Centauri. Oh yes, that is the time as observed on Earth. Here is where the effects of time dilation begin to show up, for on the ship only 15.3 years is perceived to pass by. You see that even at 27 percent of the speed of light the time dilation is not a big effect.

Well now, as long as we have gone this far, let's go whole hog and ask ourselves: what would happen if we had a way of converting 100 percent of the fuel mass into energy? Converting all the fuel into energy implies that the exhaust is pure radiation. This means we have a photon rocket: the exhaust velocity is the speed of light. Since this is the greatest exhaust velocity we can ever have, a photon rocket is capable of accelerating a spaceship to the maximum possible velocity.

The radiation pressure of a light beam is well known. The average light beam doesn't apply much pressure because it doesn't carry very much power. Increase the power and the light beam will exert a noticeable force; there will then be a reaction against the light source that will be just like the recoil of a rocket engine.

The force exerted by a light beam (in Newtons) is equal to the power in the beam (in watts), divided by the speed of light (3×10^8 m/sec). Remember that a kilogram of mass has a weight of 9.8 Newtons. This means that a force of 9.8 Newtons will give a kilogram of mass an acceleration of 1 g. Using the above equation, we find that we have to pour 2.94 billion watts of power (2,940 megawatts) into the photon rocket for every kilogram of mass being accelerated, in order to get a 1-g acceleration. (Note that 1,000 megawatts is the size of an average large power-generating plant.)

This points up one of the limitations of photon rockets: it takes an awful lot of power to get a reasonable amount of thrust. Even if we wanted to settle for 1/1000-g acceleration it would take 2.9 megawatts per kilogram of ship. This would give us a very small acceleration, but hopefully we could keep it up for a long time and so reach a comfortable speed. The rule of thumb is that you use the greatest exhaust velocities for the longest trips.

One thing is clear: either the method of generating photons must be highly efficient, or the ship must have a very effective way of getting rid of waste heat. Even a laser is only 10 or 20 percent efficient in turning energy into photons (at best). The rest of the energy is wasted heat. A lot of the ship will have to be heat radiator.

So much for speculation. Turning to our equations, which we know to be correct, we can calculate the performance of a 100-percent efficient photon rocket. The attainable velocities are plotted in Fig.

5. Now we begin to see some impressive numbers. A mass-ratio of 10 will bring us up to 98 percent of the speed of light. If we could do that with a 1–g acceleration, we would travel 3.9 light-years in an earth-time of 4.8 years, while the ship time is only 2.2 years.

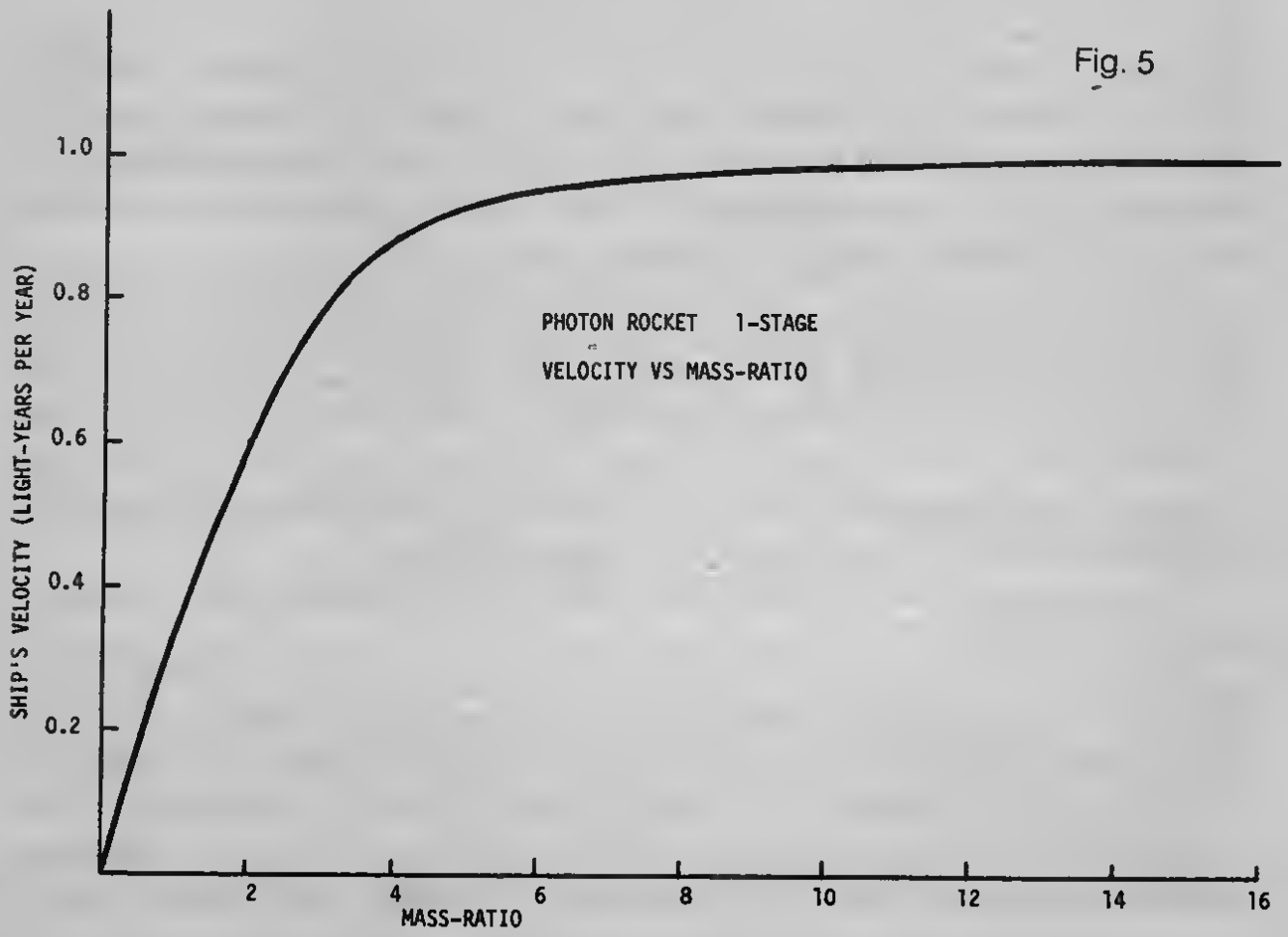
But if we were going to Alpha Centauri that would cause us to overshoot the mark, because we must leave time for deceleration. So actually we only need a mass-ratio of about 6, carrying the ship to a distance of 2.15 light-years, in an earth-time of 2.9 years, ship-time 1.8 years. Then equal times to decelerate the rest of the way. (Overall mass-ratio: $6 \times 6 = 36$.)

For the first time we have a condition where we are under constant acceleration all through the trip. We might ask what would happen if we used less acceleration in order to save power. A flick of the computer answers all.

Actually, if you are smart, you don't even have to ask the computer. It's all there in the equations.

The answer is this: suppose we go to Alpha Centauri, using a tenth of a g acceleration, instead of 1 g. This will require only one-tenth as much power as with 1 g acceleration. However, for a given mass-ratio, the distance traveled and the maximum velocity reached

Fig. 5



at the end of the acceleration do not depend on the acceleration. So it still takes a mass-ratio of 6 to get to the halfway point, with a maximum velocity of 0.946 times the speed of light. On the other hand, the times involved are inversely proportional to the acceleration, so that with 0.1 g acceleration it will take ten times longer to make the trip—both ship time and planet time. As a result, it takes just as much energy as it did with 1 g.

These results are perfectly general and apply to all rockets. In a practical situation you are usually limited by the amount of power you can put into the ion drive, plasma rocket, or whatever. This means you probably cannot sustain a full 1-g acceleration—certainly not with current technology. So you drop down to whatever amount of thrust your power source will allow, and as long as you can keep going for a sufficient time, you will eventually reach your destination.

5. The Bussard Ram Jet.

The Bussard ram jet is a device invented in 1960 by R. W. Bussard, a nuclear engineer who is the author of a well-known treatise on nuclear rocket propulsion. For several years, when reading of Bussard ram jets being used for interstellar propulsion in science fiction stories, I went along under the illusion that this was strictly a fictional device. Then I found that a technical paper analyzing the operation of this drive had been published in one of the astronautical engineering journals, and so was to be taken seriously. Publication in a technical journal allows us to call the idea speculative, rather than fictional.

The idea behind the drive is as follows: imagine a ship sailing through space with an enormous scoop spread out ahead of it. The scoop may be material, or it may consist of magnetic fields, or anything else you can imagine. No matter. The function of this scoop is to collect the hydrogen atoms floating about in space—even interstellar space. Between the stars there are about one hydrogen atom per cubic centimeter, which means a million atoms per cubic meter. And a rapidly moving ship cuts through a lot of cubic meters of space per second.

The ship thus collects hydrogen gas from space, compresses it into a reaction chamber, and forces it to undergo the solar fusion reaction that we discussed previously. Four hydrogen atoms fuse together to form a helium atom, and the excess energy hurls the helium out through the exhaust. With a perfectly efficient system, the exhaust velocity would be 12 percent of the speed of light.

This scheme is a jet, rather than a rocket, because the mass needed for the exhaust is collected from the surroundings, rather than carried in the ship. Therefore the limitations of mass-ratios are avoided. Theoretically the ship could accelerate indefinitely, reaching very close to the speed of light, limited only by the requirements of relativity.

Because of the unlimited energy supply, the Bussard ram jet at first sounded like a very neat scheme for reaching high velocities. While the technology for accomplishing the scheme appeared quite horrendous, in the framework of science fiction the enormity of the engineering is only a challenge to the imagination.

However, the fundamental laws of nature cannot be overlooked; and the Bussard ram jet runs right smack into them. It's basically a matter of friction. You normally don't think of friction in space, but when you are going fast enough, the drag of those scant atoms floating around is going to become appreciable. (In fact, Doc Smith, in the Lensman stories, made the point that the velocity of his inertialess drive vehicles was limited by the friction of the interstellar medium. From relativity he didn't care.)

So the ram jet is going to run into the same effect that skydivers encounter. You jump out of an airplane without a parachute and your speed of fall increases until the upward air resistance just equals the downward pull of gravity. Then you travel with a constant "limiting velocity."

What is the limiting velocity of a Bussard ram jet? You can calculate it by finding the force exerted by the hydrogen atoms on the front surface of the collector and equating that to the thrust of the exhaust. When you do that you find a singularly simple result: *the maximum velocity of the jet is equal to the velocity of the exhaust.*

At first blush it is surprising to get such a simple result. Then you think about it a little more and you realize that it has to be this way. Equilibrium (constant velocity) comes about when the momentum transferred to the collector from the interstellar hydrogen equals the momentum transferred to the exhaust by the engine. Since the mass of hydrogen being collected equals the exhaust mass, it follows that the velocity of the hydrogen relative to the ship must equal the exhaust velocity relative to the ship. This means that the exhaust is at rest relative to the interstellar hydrogen gas! In other words, all that happens is that the ship burrows its way through the interstellar medium, leaving the gas undisturbed, except that some of the hydrogen is converted into helium.

The result of all this is that the maximum velocity attainable by

a Bussard ram jet is about 12 percent of the speed of light, or 36,000 km/sec. It's a shame, but that's the way it is. Faster ships will have to be better streamlined.

The Bussard name has recently surfaced again. He has gotten into the thermonuclear fusion business with a proposal for a novel and controversial tokamak scheme, one supposed to be more economical than others. His proposal was turned down by the Department of Energy because while the machine might have worked if you stretched every possibility to its ultimate limits, he had left no margin for error, no safety factors.

That's the difference between writing science fiction and writing an engineering proposal.

6. The Wormhole Jet.

Not to be outdone, I am going to propose my own method for reaching the stars. I have not made an exhaustive search of the literature, and so cannot guarantee that this idea has never been used before. Sad experience has taught me how hard it is to have an original idea. Nevertheless, as far as I am concerned this idea is original, and the calculations are my own (although I have seen bits and pieces of such calculations elsewhere).

The idea is based on the theory of wormholes, originated by John Archibald Wheeler, the distinguished physicist, formerly at Princeton, now at the University of Texas. Wheeler considered the possibility that distant regions of space could be connected by tubes, called wormholes, that essentially go "behind" space, rather than "through" normal space. So if you could go through a wormhole, you would pass quickly from here to there without traveling the whole long distance. It would be a shortcut. (To be perfectly honest, Wheeler did not believe that such wormholes exist in the normal universe. However, as science fiction people, we may entertain that possibility.)

In science fiction we are familiar with such ideas as hyperspatial tubes, fourth-dimensional travel, and so on. The analogy of folding a piece of paper so you can move from one point to another point across the fold instead of going around the long way quickly comes to mind.

Now I go into speculation. Let us assume that we know how to build a wormhole generator. With this machine we can project a wormhole from one point in space to another. Our normal space only sees the two ends. The tube itself goes around, or across, or through some path invisible in this universe.

I'm going to make the arbitrary assumption that matter cannot go through a wormhole without being annihilated and converted into radiation. It behaves like a black hole in that respect. Otherwise things would be too easy. If you sent a spaceship through a wormhole you would have instantaneous travel, like Doc Smith's hyperspace tube. To make things interesting, I'm going to assume that the only thing that can go through a wormhole is radiation—that is, photons. So this allows radio waves, visible light, gamma rays, etc.—the whole spectrum.

You recognize that this is the same wormhole I discussed in a previous article on "Faster Than Light Paradoxes." There I used the wormhole only as a means of communication. Now I'm going to show that a wormhole can also be used as a means of propulsion. All you have to do is extend the wormhole so that the far end of it is somewhere inside the sun (or nearest star), while the other end points out the tail of the spaceship, forming an exhaust nozzle. Now radiation from the interior of the sun squirts through the wormhole and out the nozzle. In order to conserve momentum, the radiation pressure must react back on the wormhole and on the wormhole generator. The generator is fastened to the ship, and so the ship is thrust forward.

Is there enough radiation pressure inside the sun to make this work? We can find out very quickly. The temperature at the center of the sun is estimated to be about 16 million degrees Kelvin. The radiation pressure is given by the Stefan-Boltzmann law, which tells us the amount of power radiated by a black body at a given temperature, and if we know the power we can find the pressure by dividing by the speed of light, as discussed previously. The pressure is proportional to the fourth power of the temperature, so that when you get up into the millions of degrees, that radiation pressure becomes considerable.

At the center of the sun, assuming 16 million degrees temperature, the radiation pressure would be about 1.6×10^{13} Newtons per square meter, which is a trifle excessive. Let us dip our wormhole into a spot in the sun where the temperature is only 5 million degrees. The radiation pressure there is 1.6×10^{11} Newtons per square meter, just 100 times less than at the center.

Now let's assume that we have a spaceship massing 1 million metric tons (1 billion kilograms), and we want to give it an acceleration of just 1 g, which is nearly 10 meters per second squared, in round numbers. That will require a force of 10 billion Newtons (1×10^{10} N). Using the radiation pressure calculated above, we find

that we can get that thrust with a wormhole whose cross-sectional area is only 640 square centimeters. Feasibility proven!

Even with the gargantuan spaceship we have assumed, the demands on the wormhole are quite modest. The wormhole can be considered as a source of almost infinite energy. The power required to drive the above spaceship is 3×10^{12} megawatts—a trillion megawatts. That's the power output of about a billion large conventional power plants. The total power used by all of the people on Earth is of the order of several million megawatts—a trickle compared to the power needed to drive our starship.

Do we worry about the sun running out of energy? The power constantly radiated by the sun is about 4×10^{20} megawatts! That's a hundred million times more than the power we are using to run the ship. So it's like sucking water through a straw from a big reservoir. It'll be a lot of years before the sun notices any difference.

This is what we need for a really proper stardrive. An unlimited supply of energy that we don't have to drag around with us. Since this ship is essentially a jet, we don't have to worry about the rocket equation, which involves burning the fuel carried by the ship. The rest-mass of the ship remains constant, and as the ship picks up speed its relativistic mass will increase.

All that remains is to calculate how fast and how far the ship can go in a given amount of time. The simplest way to do it is to specify the elapsed time as seen by the people in the ship, and then use the equations in the appendix to calculate how things look to the people on Earth: the elapsed time, the distance traveled by the ship, the ship's velocity, and its mass.

This is a great amount of information to present at one blow. The simplest way is simply to reproduce the computer printout (Table I). Also, in Fig. 6, I plot the distance traveled (Earth reference frame) versus time as experienced by those in the ship. The numbers in the table show some rather surprising results. It is a most dramatic example of how far you can go if you have a way of maintaining a constant 1 g acceleration for a reasonably long period of time.

For example, after 2 years ship-time the ship is already moving at 97 percent of the speed of light, has covered a distance of 2.9 light-years, while 3.75 years have elapsed on Earth. The ship is already past the turn-around point for Alpha Centauri.

After 4 years ship-time the speed is 99.95 percent of light-speed, the distance traveled is 28.9 light-years, and the time on Earth is 29.9 years. From here on out the ship is traveling at essentially the speed of light—one light-year per year. If we make a plot of Earth-

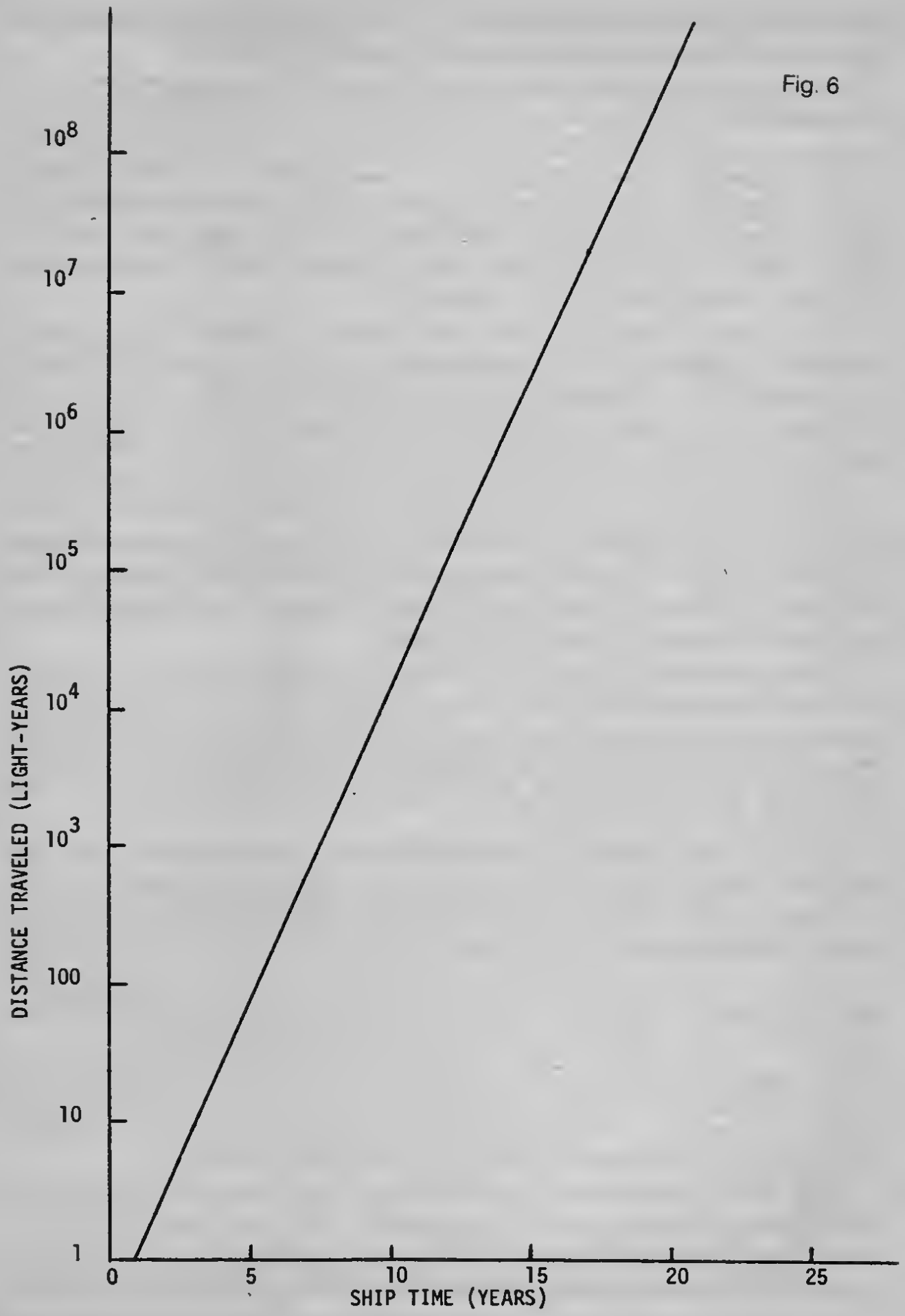
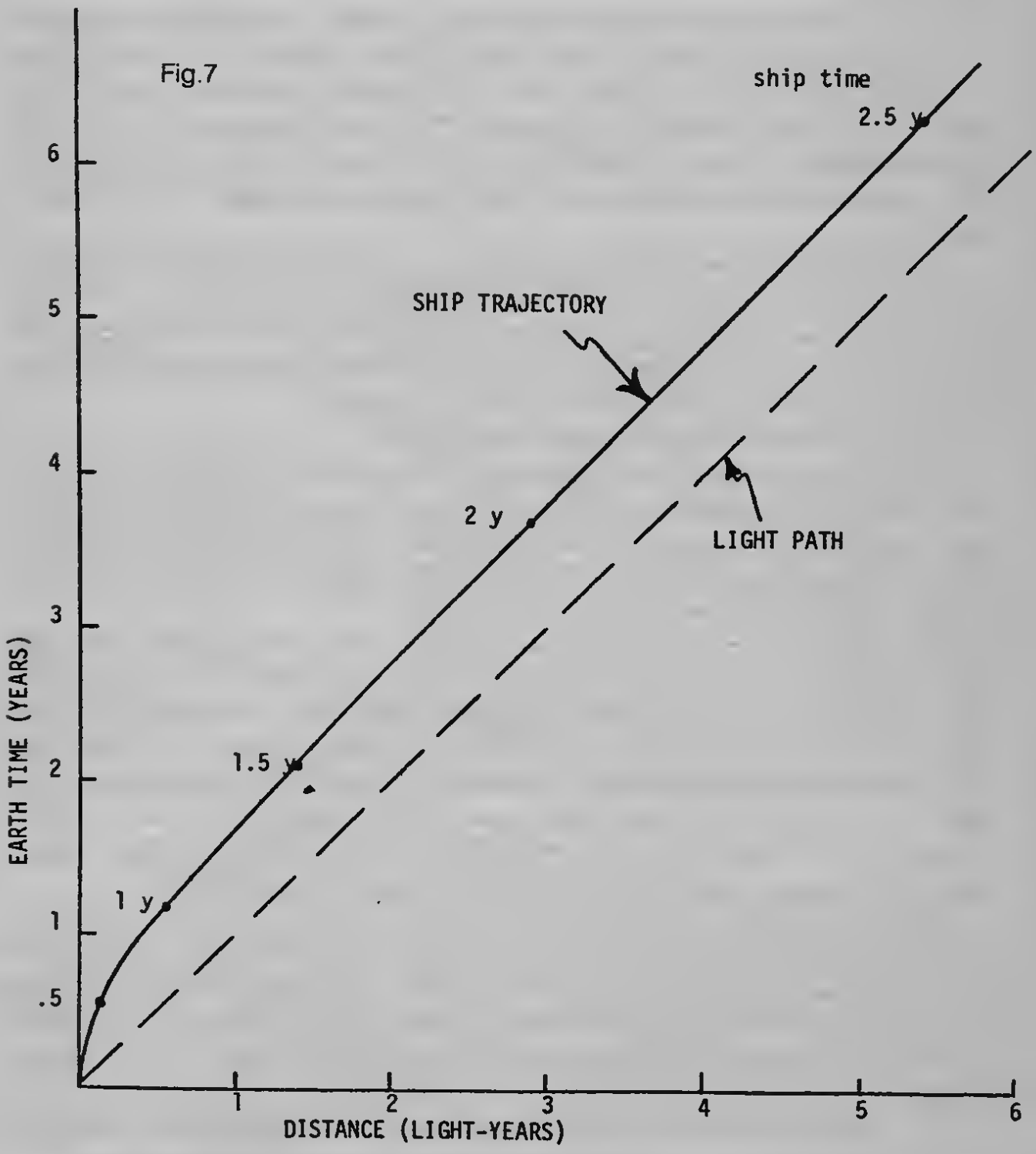


Fig. 6
10^8
10^7
10^6
10^5
10^4
10^3
100
10
1
DISTANCE TRAVELED (LIGHT-YEARS)
0
5
10
15
20
25
SHIP TIME (YEARS)

time vs. distance for the first few years (Fig. 7), we see that the trajectory is curved at the beginning, while the ship has a large amount of acceleration, but then as the ship approaches the speed of light the trajectory straightens out and the velocity of the ship becomes almost constant.

To our classically trained minds, what happens is a very strange thing. With the ship moving closer and closer to the speed of light, the acceleration as seen from Earth drops down to nearly zero. No



matter how many years the thrust is applied, the ship can't go much faster, since it's already pushing up against its maximum velocity: the speed of light.

Since the computer can no longer handle the calculation when v/c becomes greater than 0.9999999 or so, I had it calculate 1 − v/c after it got past the 4th year. Therefore in the velocity column of Table I, v/c is given as 1 minus the small difference between light speed and the ship's speed. You see how minuscule that difference becomes.

While the ship travels with almost constant speed, the thing that does change is the perception of time. Time on the ship slows down compared with time on Earth. After 235 years have elapsed on Earth and the ship has traveled a distance of 234 light-years, only 6 years have gone by on board ship. After 10 years on the ship, 14,460 years have transpired on Earth, and the ship has traveled 14,460 light-years.

The ship just plods away one light-year per year relative to Earth. So it takes a million years to go a million light-years, but to the people on the ship only a little more than 14 years have gone by. In this way it is possible to go not only to distant stars, but to distant galaxies within the lifetime of a human being.

Getting back to Earth is another matter.

We can make the following scenario: We board Starship Wormhole on New Year's, 3000 A.D. To do this we take a shuttle from Earth, and board the ship waiting in high orbit. It would not be advisable to have the ship blasting off directly from Earth's surface. The exhaust makes a rather fine weapon.

The wormhole drive is gradually turned on, and in a few minutes we are up to full 1 g acceleration. There it remains for 10 years, during which time the passengers have passed the time as best they can. At the end of the 10-year period, the ship is turned around and deceleration takes place for another 10 years. The passengers then find that they have reached a star 28,920 light-years away from Earth (2 × 14,460 Ly). They would be well advised to stay where they are and not worry about what is happening on Earth.

However, if they are curious, they can turn around and come back. Again 10 years accelerating and 10 years decelerating, but 28,920 years elapsed in Earth frame. So a total of 57,840 years have gone by on Earth while the travelers experienced 40 years of time. They return in the year 60,840—they have literally been traveling in time.

You notice that this kind of time travel can happen only towards

the future. There is no way to get the order of events mixed up. Not by traveling. However, if you use the wormhole for communication during the trip, then you can talk with the past and you get into paradoxes.

The wormhole generator is sheer speculation, perhaps sheer fiction. I don't know whether such a thing is possible or not. But I have tried to show what kind of consequences would be the logical result of such an invention. In doing so, we learn a great deal about relativity and the limitations that it imposes upon travel through interstellar space.

There are other questions that can be raised. For example, a ship traveling just below the speed of light encounters interstellar hydrogen gas at an enormous rate. It looks to the ship as though it is being bombarded by protons in the GeV energy range. This bombardment on the front end of the ship will produce great amounts of radiation throughout the ship. Without adequate shielding the crew might be fried. I would build the front end of the ship out of an asteroid.

With enough energy anything is possible. (Almost.)

For those of you planning to use the wormhole drive to propel your starships, let me give warning: my own novel on the subject is now making the rounds.

APPENDIX

The Equations of Relativistic Starship Flight

I have not seen all of these equations brought together in one place before. Not that this is a great feat of scientific discovery. These derivations are about at the level of the end-of-chapter problems found in any undergraduate textbook on relativity. In fact, I got the derivation of the relativistic rocket equation, Eq. (10), from a worked-out problem in *Spacetime Physics*, by E. F. Taylor and J. A. Wheeler (W. H. Freeman, 1966). Some of these equations are also discussed by Poul Anderson in an article entitled "How to Build a Planet," in *The S.F.W.A. Handbook* (Science Fiction Writers of America, 1976). A plot of distance vs. time for a constantly accelerating vehicle is given in *Intelligent Life in the Universe*, by I. S. Shklovskii and Carl Sagan (Holden-Day, 1966).

In doing these calculations it is most convenient to use years (y) for units of time and light-years (Ly) for units of distance. The velocity of light (c) is then just 1 Ly/y. It's an interesting coincidence that the acceleration due to gravity at the earth's surface (g = 9.8

m/sec²) turns out to be just 1.0302 Ly/y². In other words, a 1–g acceleration is very nearly a unit acceleration, in a system measuring distance and time in light-speed units. There's nothing at all mystical about this—it's just a happenstance.

In books on relativity the Greek letter beta (β) is universally used for the ratio v/c—the speed of an object compared with the speed of light. To avoid confusion I will use the same abbreviation.

The following table summarizes all the symbols and definitions that will be used:

a = acceleration of ship in the ship's reference frame.
a_p = acceleration of ship in planet's reference frame.
v = velocity of ship relative to planet.
$\beta = v/c$ ($c = 1$ Ly/y)
v_e = velocity of exhaust relative to ship.
(For a photon rocket $v_e = 1$ Ly/y)
$A = a/c = 1.0302\ n$ (where n = no. of g's acceleration)
x = distance traveled by ship in planet's reference frame.
T = elapsed time in ship's reference frame.
t = elapsed time in planet's reference frame.
m_0 = initial rest-mass of the ship.
m = relativistic mass of ship in planet's reference frame.

Equations for the Relativistic Jet

For each relativistic equation there is a corresponding (and more familiar) classical equation which is good for velocities small compared with the speed of light. These classical equations will be given on the right side of the page.

We will consider a ship traveling with constant acceleration as observed by the people in the ship (a = constant). The acceleration as observed on Earth is:

(1) $a_p = a(1 - \beta^2)^{3/2}$ $\qquad a_p = a$

If dT and dt are small intervals of time in the ship frame and the planet frame, respectively, these are related by:

(2) $dT = dt(1 - \beta^2)^{1/2}$ $\qquad dT = dt$

These equations may be integrated to find the distance, velocity, and earth-time after a given elapsed ship-time:

(3) $x = (c/A)[\cosh(AT) - 1]$ $\qquad x = (1/2)at^2$

(4) $v = c \tanh(AT)$ $\qquad v = at$

(5) $t = (1/A)\sinh(AT)$ $\qquad t = T$

(6) $m = m_0 \cosh(AT)$ $\qquad m = m_0$

The most noticeable thing about these equations is that they all involve hyperbolic functions. As pointed out by Taylor and Wheeler in *Spacetime Physics* this is a natural consequence of the geometry of spacetime.

These equations can be simplified somewhat for large values of AT. The hyperbolic functions are written in terms of exponentials such as $\exp(AT)$ and $\exp(-AT)$. The decreasing exponentials become very small compared with the increasing ones for large values of AT, and so we can write, approximately:

(7) $x = (c/2A)(e^{AT} - 1)$

(8) $v = c$

(9) $t = (1/2A)e^{AT}$

Now it becomes apparent that x and t are increasing exponential functions of the ship-time T. This is why distance and time increase so dramatically when T becomes greater than 5 years or so. It also explains why we get a straight line when we plot x versus T on a semi-log graph.

Equations of the Relativistic Rocket

In the rocket, fuel carried by the ship is burned and ejected from the exhaust. The velocity of the ship is determined by the mass-ratio $R = m_0/m_f$. Here the final mass m_f is the rest mass of the ship after the fuel has been consumed. So it is the mass as seen in the ship's frame. The laws of conservation of momentum and energy are used to obtain the relativistic rocket equation:

(10) $v = c \tanh[(v_e/c)1n\ R]$ $\qquad v = v_e\ 1n\ R$

(Here 1n R is the natural logarithm of R.)

For the photon rocket ($v_e = c$), this equation reduces to the remarkably simple result:

(11) $v = c(R^2 - 1)/(R^2 + 1)$

The time required to reach the final velocity is given by:

(12) $T = (v_e/Ac)1n\ R$ (in the ship frame) and
(13) $t = (1/A)\sinh(AT)$ (in the planet frame).

For the photon rocket, again a simple result:

(14) $T = (1/A)1n\ R$
(15) $t = (1/2A)(R - 1/R)$

Using these equations and either a hand calculator or a computer you can answer any questions you might want to ask about an interstellar space trip. Except how to build a wormhole generator.

Table I

SHIP TIME YRS	EARTH TIME YRS	EARTH DISTANCE L-YRS	SHIP VELOCITY V/C	SHIP MASS M/M_0
0	.000E+00	.000E+00	.000E+00	1.000E+00
1	1.187E+00	5.623E−01	7.740E−01	1.579E+00
2	3.748E+00	2.901E+00	9.681E−01	3.988E+00
3	1.065E+01	9.724E+00	9.959E−01	1.102E+01
4	2.989E+01	2.894E+01	9.995E−01	3.081E+01
5	8.377E+01	8.280E+01	1-6.713E−05	8.630E+01
6	2.347E+02	2.337E+02	1-8.553E−06	2.418E+02
7	6.575E+02	6.566E+02	1-1.090E−06	6.774E+02
8	1.842E+03	1.841E+03	1-1.388E−07	1.898E+03
9	5.161E+03	5.160E+03	1-1.769E−08	5.317E+03
10	1.446E+04	1.446E+04	1-2.253E−09	1.490E+04
11	4.051E+04	4.051E+04	1-2.871E−10	4.173E+04
12	1.135E+05	1.135E+05	1-3.658E−11	1.169E+05
13	3.180E+05	3.180E+05	1-4.660E−12	3.276E+05
14	8.908E+05	8.908E+05	1-5.937E−13	9.177E+05
15	2.496E+06	2.496E+06	1-7.564E−14	2.571E+06
16	6.992E+06	6.992E+06	1-9.636E−15	7.203E+06
17	1.959E+07	1.959E+07	1-1.228E−15	2.018E+07
18	5.488E+07	5.488E+07	1-1.564E−16	5.654E+07
19	1.538E+08	1.538E+08	1-1.993E−17	1.584E+08
20	4.308E+08	4.308E+08	1-2.539E−18	4.438E+08
21	1.207E+09	1.207E+09	1-3.234E−19	1.243E+09
22	3.381E+09	3.381E+09	1-4.121E−20	3.483E+09
23	9.473E+09	9.473E+09	1-5.250E−21	9.759E+09
24	2.654E+10	2.654E+10	1-6.689E−22	2.734E+10
25	7.435E+10	7.435E+10	1-8.522E−23	7.660E+10

NOTE: 3E08 = 3×10^8

1. Newton's third law of motion violated by moving electric charges. Charge Q_1, moving in the x direction, produces a magnetic field B_1 at the location of the other charge Q_2. Charge Q_2, moving in the y direction, feels a magnetic force in the x direction. The magnetic field produced by Q_2 is zero at the location of Q_1, and so there is no magnetic force acting on Q_1.

2. The velocity of a liquid fuel rocket as a function of mass-ratio (initial mass divided by final mass). For the 3-stage rocket the mass-ratio is for each individual stage.

3. The velocity of an ion or plasma rocket vs mass-ratio. Exhaust velocity is 4,000 km/sec. Note that the rocket velocity equals the exhaust velocity when the mass-ratio equals e (2.718).

4. Velocity of a hydrogen fusion rocket vs mass-ratio. Relativistic equations have been used here.

5. Velocity of a photon rocket vs mass-ratio. With a mass-ratio of 10, the rocket comes within 2% of the speed of light.

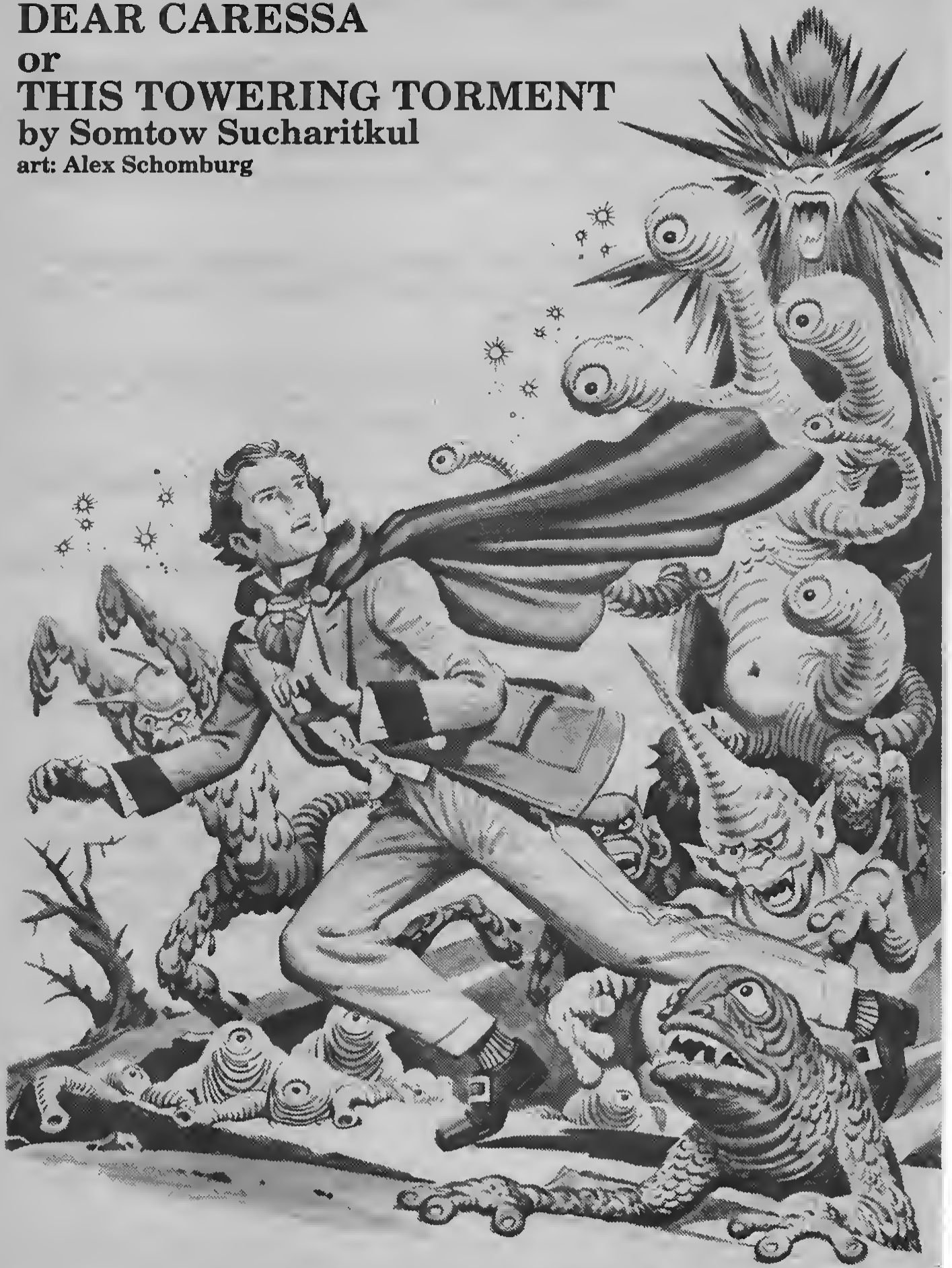
6. Distance traveled vs ship-time for a relativistic spaceship under constant 1–g acceleration. The vertical (distance) scale is logarithmic, while the horizontal (time) scale is linear. This indicates that the curve represents an exponential function of time.

7. The trajectory of a starship in spacetime. Distance and time are shown in Earth's reference frame. The dashed line shows the trajectory of a light beam leaving Earth at the same time the ship leaves. The ship increases speed for a brief period (curved segment) and then it travels with almost the speed of light so that its path parallels the light beam. Points on the trajectory show ship time in comparison with Earth time.

DEAR CARESSA
or
THIS TOWERING TORMENT

by Somtow Sucharitkul

art: Alex Schomburg




SCHONBURG

Every writer has a Vision. Not always an entirely sane *Vision, but a Vision nonetheless. What follows is Mr. Sucharitkul's vision of What's Really Happening on our cover.*

I'd thought that moving to suburbia would save my marriage. Save me from Dusty, my daughter of the Brooklyn Bridge braces and the Nosferatu-ish smile. From my son Boogie, torn-tee-shirted prepube of serpentine precociousness with the chocolate-chip-cookie face and those kestrel eyes. And especially from my wife Rebecca, an immaculate, pre-feminist woman who worked for the household like a dog—and was about equal to one in I.Q.

I had no idea my life would turn into a science fiction story.

That, I suppose, I owed to Hermie Tebaldi.

You're surprised I know him, aren't you? Nobel laureate and all, author of "An Application of Irrelevance Theory to Synchronicity and Quantum Mechanics," the paper that crossed Einstein with Jung and spawned a monstrous hybrid that people are still arguing about to this day? Well, to me he was the boy next door. Got into scrapes together—somehow, though, only I got the spankings—went to Princeton together, ended up teaching at U. of Penn. together (although naturally *he* was head of his department). I won the Rothman Fellowship and he got the Nobel prize, all in the same day.

He died. Or rather, he disappeared mysteriously while doing research on transfinite transdimensional interfaces. (If this were science fiction, they'd dream up some pseudoscientific nonsense to call it, "alternate-reality-paradigms" or "parallel universes" or something.) And left me the house in his will. My family and I thought we'd been saved.

But nothing changed. I was still a man who had married too early in life—one of Hermie's cast-offs, at that—with a couple of unsavory kids, an unfinished paper on archaeopteryxes, and a stupid wife.

That summer the stupid wife discovered the romances of Caressa Byrd.

I turned over in bed and my nose hit an open paperback. I fumbled for the light. Becky must have gotten up, but the sheets still smelled faintly of Givenchy and pepperoni. (Some days it was salami and Shalimar.) I elbowed the paperback off the bed: it was *This Towering Torment* by Caressa Byrd. I groped for the curtains—

Midmorning light fell through the blinds, zebrastriping the primrose-studded sheets. I arose, tripped over a copy of *Chastity's Chastisement*, and made for the bathroom, cursing all dull Saturdays.

I degrunged myself. Shaving was like brushing the dust from archaeopteryx bones. Better to be a character in one of Caressa Byrd's romances! That woman had written 200 or more, all in the first person; many of the fans thought that they had all really happened to her.

Coming out in a bathrobe, I felt paper prickle my feet and knelt down for a look. A trail of paper had dribbled from an old rattan wastebasket.

I like all my things in the right place and this was on the wrong side of the bed. I picked up the papers and tossed them back in, thinking: *Funny, I haven't written anything lately, and Becky's too illiterate* . . . I uncrumpled a piece and began to read:

> *Dear Caressa* [it began, in spiky, awkward script]
> *This is my twentieth letter to you. I have read every one of your books and know that you are very experienced in matters of men. It's Arthur. I love him so much, but he doesn't love me any more. Maybe he doesn't want me. I wish I could be like in your Love's Ravening Ravishment when the old woman said to you "But do you love him enough to give him up?" and you cried for days afterward. He is a great scientist and I am only a high school sweetheart that he knocked up I mean had an indiscretion with, I know I am too dumb for him. Is it right for me to punish him like this? I know you are very busy but I wd. appreciate a response at your convenience.*
>
> *Sincerely yours*
> *Rebecca Kurtz*

I couldn't believe it. I unscrunched more paper (heavily Chanel No. 19–doused, I noticed) and found more uncompleted drafts.

That's it, I thought grimly. *She's over the edge.*

I marched downstairs in a rage, brandishing the letter.

"Damn it," I shouted half-way into the kitchen, "do you have to use so much perfume?" The smell of baked ham and Nina Ricci filled the room.

She turned round from her cooking. She wasn't exactly ugly; she had a mop of red hair over a face three shades too pale, liberally

sploshed with freckles. "I want to smell nice for you," she said. "Isn't that all that matters?" She looked very vulnerable; her eyes were watering and I felt both furious and guilty.

"Look!" I yelled, waving the letter. "You've gone crazy!"

"I need all the help I can get—"

"Damn it, I want a divorce!" I screamed.

She started to cry—went on and on as though it were some eye exercise—and said, "All right dear, if that's what you want. I knew it would come to this . . . here, eat your breakfast, it's your favorite. . . ." Then she buried herself in *Passion's Fiery Sling* and the conversation was over. I hadn't even gotten her mad, damn it! I stomped into the back yard, and—

The basement window! I found myself staring at it. *It's been broken into! Damn raccoons!* I started to panic. There wasn't any real reason for us to have kept the basement boarded up, even if it *had* housed the esoteric devices Hermie Tebaldi had been working on towards the end of his life. And yet . . .

Damn raccoons, I thought, cursing. *Dog must have broken in after it.*

I'd never thought of trying to get into the basement before. But now—

Glass-shards lay on the grass, dazzling my eyes in the summer sunlight. The window was shattered; a man could easily squeeze through—

It wasn't snooping, damn it, it was my own house. And I had too many problems that day. My family. My unfinished paper and the pressure of publish-or-perish. No better way to deal with pressure than go and do something completely different.

I snaked over to the opening and lowered myself gingerly onto the—

There wasn't any floor!

I was falling, falling, falling—like Alice down the rabbit-hole. Only I didn't have time to make inane comments like "Do bats eat cats?" or to calculate the distance to the center of the earth. I was too busy screaming.

First it was soft soft soft and dark dark dark, like being on the couch at my analyst's and listening to the drone of her hypnotic voice. I was falling but there wasn't really any down; I was screaming as hard as I could but the sounds were lost, there wasn't any echo; this wasn't a mine-shaft or something that had somehow been grafted on to my basement, it was something far huger, and I knew

I'd hit bottom sometime and it wouldn't be pleasant, but the thought was somehow so distant, so insignificant. I seemed to be shedding all my worries, my anxiety over the impending divorce, my anger, my self-frustration. . . .

Forget everything, I thought, *until this dream is over*. . . . Gradually I made out a sourceless red glow around me. I couldn't see very far. My feet were being sucked into something half-solid, and then I hit ground and was running—

A wild Wuthering Heights–type landscape, gray helter-skelter heather, knee-high, cresting and ebbing in a singing wind. Black cloth flapping in my face, and I knew I wasn't wearing the same clothes I set out with. A starched, uncomfortable high collar hugged my neck, and it was a black cloak lined with crimson that I was wearing, streaming in the wind, and I was running. I tried to brake myself but I couldn't halt the momentum. I remember thinking all the time that the dog must be loose in this metamorphosed basement, with a raccoon backed into a corner somewhere—

The wind was warm. There was an enticing odor of French perfume, spiked unaccountably with pepperoni. *Becky!* I thought. *She's at the bottom of this!* I knew I wasn't making any sense at all, but neither was this whole experience.

After a while I managed to slow down. The moor stretched to the horizon all around me. There was no way to judge distance, except . . . yes, the horizon seemed strangely near. It was a distorted world. Two moons careened in the sky, blood-red and huge; they were the source of the strange red glow; and then ahead I saw a silvery glint among the . . . oh yes, weird, rocky outcroppings, I hadn't caught them before . . . it was as if the whole landscape was coming more into focus and I was seeing more details all the time. I slowed down to a walk, panting heavily—I'm not that young anymore—and began to make for the silvery point of light that flickered between black fantastical monoliths. It was a demon force that pushed me forward. I stumbled onward, never quite coming to a full stop.

Arthur, oh Arthur. . . .

Everyone dreams of a voice like that. It sang to me in the wind. It was a girl's voice, a child's voice almost. The wind blew on my cheek like a soft hand. I struggled to loosen my collar, my chafing Victorian clothes—

Then I saw the tower.

I couldn't tell how far it was. The scale was all wrong here, wherever "here" was. Both moons had moved behind it. The light had

come from a window in its topmost turret—

But what a tower! It was like a rocketship and it was like a tree. It was like a Corinthian column plated with silver and torn from a Greek temple and overgrown with chromium vines. Glitter-rich flying buttresses sprouted from the naked rock. It was a bewildering madness. *And it was singing my name.*

Arthur, oh Arthur, it sang to me in its achingly beautiful voice, *I've waited for so long, Arthur, please come to me now, enter me, possess me, be one with me—*

The wind was streaming against me. I was being drawn towards the tower, being sucked into a lorelei whirlwind. . . . "No!" I screamed. "No! No!" I tried to think of Becky and the kids but they were so far away. I felt like a little genie battering away helplessly at the walls of his glass bottle.

A swath of light, tinseled like fairy light in a Disney cartoon, fell on me from the window. But somehow it wasn't kitsch. I felt like a kid again, wanting so hard to be someone, identifying with the prince on the horse, and my cloak was flapping behind me and billowing around me and it was like the time I pulled little Sharon out of the tree—

But Hermie Tebaldi was the one who made it with her, damn it!, I remembered, coming down to earth. I remembered Hermie and I snapped. *I'm getting out of this nightmare*, I told myself. "Let go of me," I screamed. "Whatever you are, understand, let go, let go—"

In a flash, I saw two archaeopteryxes soar across the swath of light, noting how closely they conformed in gliding patterns to my hypothesis—

I came to on the hard damp concrete.

I looked around me.

Machines, dusty, an old typewriter. Nothing that seemed to make much sense. This was the basement all right, though; ahead, the narrow stairs had to lead to the kitchen closet. I rubbed my eyes a couple of times. *Getting flaky*, I thought. *Must call Dr. Webern in the morning.*

I heaved myself off the concrete and shambled around. *But weird*, I thought, *I've been on the wagon for over six months now, I shouldn't have been seeing things. . . .*

That voice came back to me, so enticing, so erotic. I could almost have stepped back into that moor under the red moons again, but—

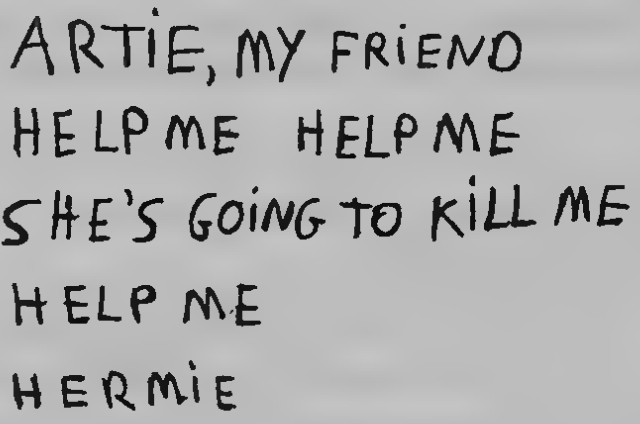
Back! I told myself quickly. *With all your problems, schizophrenia is something you can do without.* It was very dark in the basement, except where light fell in spider-strands, pinholing through chinks

in the boards. And there was a big stripe of dazzling sunshine through the broken window, stippled with dancing dust-motes.

I glanced at the machines. I couldn't tell what they were, of course. The theory of transdimensional interfaces wasn't exactly my field—and frankly I never had the math to follow even the simplest of Hermie's theories.

Everything was in obvious disarray. I hate messes, and it had always irked me that Hermie could dream up such elegant theories when he couldn't even tie his shoelaces or file a carbon. I looked around, getting angrier and angrier.

The light from the window fell on to some kind of lab bench. A piece of paper, a page from a looseleaf notebook, weighted down by a book, caught my eye. There was a message on it, in huge, childish capitals—



I rubbed my eyes. The red ink glowed in the glare. What the hell was this? Who was *she*? How old was this message, anyway?

There was only one *she* I could think of right now—

The voice! The singing wind from the tower that sparkled silver in the blood-red moonlight! *Arthur, oh Arthur*—So sensual, so seductive. And me in my chafing collar and black cape, breasting the wind like a prince from a soppy novel or a childhood myth . . . haunting. Haunting. Haunting.

And suddenly, somehow, I knew that the voice could be mine—I mean, the creature behind the voice—for instinct told me that inside the tower there must be a princess, a golden-haired Rapunzel who would sweep me away from Rebecca and Dusty and Boogie and the whole suburban schtik, and—

Get a grip on yourself, damn it! Doctor Sharon Webern will bring you back to earth.

I stood staring at the message. Unquestionably it was Hermie's

handwriting, and . . . the ink was still wet! On second thought, it wasn't ink at all.

It was blood.

"I see you've put Doctor Webern on the calendar," Boogie said, sauntering into the kitchen Sunday morning just as I'd mis-flipped my eggs. "Want to talk about it?"

"Not to you."

"Don't be silly, Dad!" he said, coming closer. He seemed tense. It's devastating when one's child is so much smarter than oneself.

Without really meaning to, I started to tell him everything. "Sheesh, Dad," he said, "it sounds heavy as hell to me. Maybe you do need a shrink . . . but then again, maybe not."

"What do you mean?" I said, plunking myself by the kitchen table and addressing my Jackson Pollocked eggs. (One thing about Rebecca—she did know how to fix food; and when she went to church of all places, which she did every Sunday morning, I had to eat my own glop.)

"Well, you just told me that the letter from Uncle Hermie was real, didn't you? Now, when you have eliminated the impossible. . . ."

"Oh, give me a break, Boogie!"

"Hold it, Dad. I've *read* Uncle Hermie's paper. It's all about parallel universes . . . he starts off with the assumption, you know, that every time a subatomic particle must make a statistical decision within the limits of the uncertainty principle, a parallel universe splits off—"

"Huh?"

"Dad, that theory was way back in the seventies!"

"Yeah, like all of two years ago." I gulped down some of the egg concoction. Sunlight played on the table, lightly leaf-dappled, too bright for my depression. Knowing you're on the verge of a nervous breakdown can be a pretty unnerving feeling—and I had been through *that* before.

"You don't get it!" Boogie cried, exasperated. I tried not to listen, but became marginally interested in spite of myself. "He was working on transdimensional interfaces when he died; that means channelling into parts of spacetime where universes overlap! He was talking about this new kind of particle, see, he was trying to generate them before he died, but he was running up against the law of conservation of strangeness . . . but I guess you wouldn't know anything about quark theory either," he added disdainfully. "Hey! Perhaps he succeeded in doing what he was working on, and perhaps

there's a transdimensional interface right in our basement! *Sheeesh!*" He paused for a breath. Then he went to the refrigerator to get a glass of milk.

"You're going to be just like Hermie when you grow up, you little bastard," I muttered, not quite concealing my bitterness.

"I knew it!" He whipped around, brandishing his milk. "You do suspect me of being *his* son. . . ."

I was shaking. He'd seen right through me, right to my innermost fears.

I tried to change the subject and go back to his theory, or whatever it was. "Okay, suppose it is another universe out there?" I said. "How would you account for the smell of Becky's cooking and Becky's perfume? And what about the Caressa Byrd–like gothic ambience?"

"Oh, that," Boogie said. But he was already leaving the kitchen. I'd hurt his feelings. Strange how Hermie still haunted this family . . . "Well, I don't know everything, you know. Even if I *am* smarter than you are." He vanished into the hall. What a hateful shrimp. The obnoxiousness of his intelligence more than made up for the obnoxiousness of Rebecca's stupidity.

I closed my eyes and remembered the archaeopteryxes, crossing the faces of the bloody moons. Why had they been so close to the description in my unwritten paper? Didn't that prove that I was going insane? I piled up my dishes and went to the sink. Through the window, Dusty and Boogie and their friends were trampling the hedges, but I was too tired for even a token yell.

Beside the sink, in a neat pile, and exuding a soft odor of Dior and spaghetti sauce, were some paperbacks: *Love's Hideous Strength, Dark Touch of Desire,* all vintage Caressa Byrds. I leafed through some of them. There were notes scrawled in the margins, things like "Apply to Arthur," and "Yes, yes, oh yes," and so on. *Sickening.*

I was just squeezing some soapsuds when a wild impulse took hold of me. I walked over to the kitchen closet. Behind the stacks of raisin bran was the door, boarded up now, that led to. . . .

In my head I heard the song of the tower, high and breathy, passionate. I reached for the toolbox on the top shelf, hardly knowing what I was doing.

An hour later I was standing at the top of the steps. *At least there's a light switch here,* I thought, *when you come in the proper entrance.* I reached for it and—

I couldn't believe it. It was like a set for a mad scientist's lab in Hollywood. Nothing could have looked more thoroughly unscientific.

Banks of equipment rose from an undergrowth of wires, leads, cables, with an occasional jack or plug sprouting up like a jungle flower. There was the table with the scrawled note I'd found the previous day. I walked down to it and scrutinized it again. The blood had caked now, rust on the yellow paper.

I laughed out loud. This stuff was supposed to create a transdimensional interface? Boogie was a bright kid, but he did read too much of that sci-fi nonsense. With light flooding the room it didn't seem nearly so daunting. I remembered suddenly, with astonishing clarity, the Christmas when Hermie and I had both been four years old and had both gotten Lego sets and I had built a car, following the instructions to the letter, and he had built a ramshackle madness so weird even he couldn't think up an explanation for what it was. That's all this basement mess was! High-and-mighty Nobel laureates had feet of clay after all. They still needed their Lego sets.

Just then I tripped over a wire and—

No! Not again!

The familiar feeling. Falling into the soft darkness. This time it didn't take nearly so long; it was as if there were less resistance, as though my previous journey had bored a wormhole through the dimensions . . . no! I was starting to believe my son's pseudoscientific babblings!

And then—

I was running in the soft gray heather on the moor under the light of the crimson moons. The wind swept me along. I leapt into it, exhilarated. And ahead, past black tarns that loomed like trolls over the landscape, I saw the tower. From its highest turret, a flock of archaeopteryxes glided, soared, their shadows shying against rock outcroppings . . . it was amazing. Their flight patterns . . . my theory was vindicated. And then I saw that the tower had grown a little. You couldn't put your finger on it. Another chrome-shiny buttress, another row of sharktooth crenellations, perhaps . . . I ran towards it. The singing had already begun.

Arthur, oh Arthur, come to me, enter me, be mine. . . .

I didn't resist. Anything had to be better than the life I was leading now. Even schizophrenia. I ran hard, and the wind helped me so I felt no strain, only a giddy exaltation. The perfume of the wind had transmuted now so that I couldn't recognize the scent. It wasn't one of Rebecca's. I stopped thinking. I ran towards the voice, hearing nothing but the voice.

Time and space—they were somehow all distorted here! I knew I couldn't have reached the tower yet, but—

It loomed above me, eclipsing the two moons, whose scarlet glow radiated from behind the silver glitter like distant fire, like the light from a far flaming city.

Buttresses soared like frozen rainbows. Turrets sprang from its sides, veined with metal moss. It was so huge I could get no sense of proportion out of it at all. And all the time it thrummed in the wind. And when I craned I caught sight of a window from which a light shone—like a searchlight, like the cover of a cheap romance.

Then the wind ebbed a little.

Enter me, the voice sighed. I stepped forward—

A door irised in the metal wall. A delicate fragrance came from it, and I moved closer, took a step inside. . . .

A rich hallway. Velvet tapestries. Oak chairs around a banquet table. French windows, a glimpse of a sculpted garden. And a huge, curving staircase that spiralled, up and up and up until it vanished into a vague silvery height. It was all impossible!

Come up the stairs, oh Arthur, Arthur—

For the moment, I resisted. I went up to the table and banged my fist on it. Solid. As real as my nineteenth century clothes had been real. . . .

I shed my cloak. I tried to ignore the voice for a moment. In the walls of this antique salon, between the stuffed rhinoceros heads, were heavy, carved oak doors. I stepped across the hall, my steps on the polished wood resounding and echoing through the vast space above me. Gingerly I tried one of the doors.

Arthur, oh Arthur, why do you ignore me? I love you so much, I need you, I adore you, enter me, love me—

I stepped through.

Nothing Victorian about this room. It was a thin corridor that stretched straight ahead until the walls seemed to converge in the distance. The walls were metal as the outside of the tower; and there was a faint acrid smell, vaguely discomforting. Lining the corridor—

A chill took hold of me. I forced myself to look at them, frozen creatures standing statue-still, staring—

For sure, they weren't people. Their skins were green or blue or purple and they had scales, some of them, and tentacles . . . but all of them had eyes. The eyes were all alive. The not-people had been transfixed in a hideous living death.

I walked on, not daring to look too hard. Some would have been monsters by any standards, some of them were strange, delicate creatures with pale pink fur and lemur eyes . . . I couldn't look at the eyes. I was sure they were alive. I hurried on, and then on my

left I found myself looking at Hermie.

"My God!" I whispered. "What's happened?" For he was the last of them, and beyond him there were rows of low podia, stretching on as far as I could see.

And obviously all waiting for occupants.

Hermie was breathing. I shook him. He was soft, still alive. "Wake up, man, talk to me, explain all this!"

He began panting. Then he said, "Artie . . . hoped you'd come . . . help . . ."

"How? How?"

"You wouldn't understand the math anyway, Artie . . . but we're in another universe, and. . . ."

"What the hell is this tower doing here? Why is it trying to seduce me, for God's sake? How can we get out of here?"

"Look, it's an alien. I know you don't believe in science fiction, but take my word for it, it's an alien, and this isn't Earth either. Look, it feeds on emotions! It *loves* people and not-people to death! It's a parasite, and it's already devoured every sentient being on this planet. . . ."

"What?"

"Got to get back," he gasped. "Or else I'll never be able to turn off the field, and the two universes are going to go on leaking into each other . . . the last time you came it was so busy trying to snare you that it weakened and I was able to escape for a few seconds; no blasted pen in that whole basement though, had to cut myself to leave the message and now it's wise to me and I can't get free. . . ."

"This has got to be a dream!" I said, squeezing my eyes tight shut and desperately *hoping*. Then I kept repeating, over and over, "Aliens don't read Caressa Byrd romances. Aliens don't know about archaeopteryxes. That's why *I'm* going crazy, and none of this is happening."

"Will you listen to me, numbskull! It's semi-telepathic, and it's got a range of about fifty meters beyond the transdimensional interface! It's been trying to lure you here for months . . . and all it's got to go on is the thoughts of you and of all the people who love you who come into range! And Becky loves you. She loves you so much it's choking her own life, damn you. And I bet all she does in the kitchen is think thoughts of you and thoughts of Caressa Byrd's romances. And of course the archaeopteryxes conform to your theory. . . ."

His voice was weakening. I didn't know whether to be convinced or not. Insanity seemed a far saner hypothesis.

"You've got to get me out of here!"

"How?" I screamed. "How can I fight a thing that's eaten a whole planet?"

"You've got to find it, and face it, and convince it, somehow. You can't come in here with a Colt .45 and riddle it with bullets. But maybe you can talk to it—"

"No way! I'm getting out of here!"

"Look," he rasped. "If I don't go back and pull the plug on this interface, the interface-leakage will begin to spread. Understand? I'm not going to spout the formulae at you, idiot, but you're my best friend so you might try just believing me. If you resist it now, while you're free, it won't be able to hold on to you, but . . . if the leakage spreads! The alien's range will get bigger and bigger. It's slow, but it's practically immortal. It'll get you in the end. It'll get Becky and Dusty and Boogie and the Langbarts and everybody else on Bevan Street and everyone in Ardmore and everyone in Pennsylvania . . . there's no limit to its hunger! Look, I hate to sound melodramatic, but the fate of the universe is in your hands!"

"Hermie, be serious, cut the sci-fi crap—"

"Don't say *sci-fi!*" he snapped, and then fainted.

I turned and ran.

My shoes clanked on the metal floor. The frozen aliens stared at me. I ran and ran—

Through the drawing room with the stuffed rhinos and the velvet drapes—

Arthur! Why are you leaving me? The voice whispered in my head, so soft and desirable, I almost turned back—

Resist, resist, I was thinking, *get yourself out of this nightmare and fix yourself a stiff drink—*

Oh, Arthur!

I didn't care about the fate of the universe. I just wanted to get out of there. I burst through the iris-door and began running like crazy, against the singing wind that caressed me like soft hands of a young girl, against the voice, so pure and so knowing, across the waves of heather. The voice sang more insistently and I started to scream to try and drown it out.

And still it sang, so that I wanted to turn back and dive into the ocean of the tower's overpowering love.

Resist, imbecile, resist! I chanted over and over.

—and staggered up the steps and burst out of the kitchen closet, screeching, sending a volley of raisin bran cascading across the linoleum tiles—

Dusty and Boogie looked up from their chess game.

"Oh, hi, Dad," Dusty said, smiling her undead smile. "Supper's in the oven."

"I've just seen your Uncle Hermie!" I gasped.

Boogie said, "Mom's upstairs packing." He smiled too, a supercilious grin. "Says you're getting a divorce."

"Well, there it is." I couldn't believe what I'd done. The family was gathered around the kitchen table and I was laying my sanity on the line. Here we were, in the heart of suburbia, a mile from the Conshohocken State Highway, with the warm light of a summer evening streaming in through the window and the chatter of children and dogs from distant backyards and birds singing and the Sunday roast waiting in the oven . . . and I was trying to talk about the fate of the universe.

Dusty spoke up first. "I don't want to hear any more of this rubbish, Dad!" she said. "You've gone bananas. Fix an appointment with Dr. Webern or something. I'm going upstairs to call Tommy and make him take me out to a movie or something. . . ."

"Not until you've done your homework," Becky said through her tears. But Dusty had run off.

"All I want to say," I said, trying to sound calm, "is that this is something I've got to try . . . for old Hermie's sake. I probably won't come back, so I want you to be a good family and try to make a go of it—"

"Stuff and nonsense, Daddy!" said Boogie. He looked at me earnestly from across the table, more serious than he'd ever been before. "I believe you, but . . . there's no point in making a big show of things and making a melodramatic stand just because you feel inadequate." I started to argue but he went on. "Don't argue, I know why you're into this trip. I also know something about Uncle Hermie's theory, too—namely that the rate of interface leakage isn't going to be quick enough to get us. Especially if we move away from here. I vote we all split. Sure, it'll get the whole Earth and the solar system and galaxy and everything else. But not, for God's sake, in our lifetime, Dad! Not if we move, say, to California. . . ."

"That's not responsible," I said. I knew he was at least half right about my motives. But there was something else too. "If *I* don't go out there and confront the thing, *nobody* will! I've got to do it!"

"*Sheesh*, Dad, I don't want to lose you!" he cried out, and then he rushed out of the kitchen. I heard him crying.

He'd never said *that* before. I'd had no idea he cared. Suddenly I

felt very strange inside.

I got up and started for the kitchen closet.

"Wait, Arthur," said Rebecca. She had stopped crying.

I waited.

"Listen. I know that if you come back we'll probably go our separate ways. I'm sorry it didn't work." She was struggling to keep her voice steady. "But . . . you say this thing creates illusions that . . . come from our minds, that it's been picking my mind for months and all it's come up with has been Caressa Byrd books. It must know how much I love you if it's read my mind, its whole set of illusions must be based on my illusions. . . ."

"What are you saying?"

"Maybe I can do something. I'm the one who knows all Caressa Byrd's books by heart . . . and even if I don't understand any of your science, I love you and that's enough. I'm coming with you. . . ."

"Don't be silly. Who's going to take care of the children?" Was she going to obstruct me even now, here when I finally had gotten a chance to do something important in my life? And yet . . . she was willing to risk her life. For the first time I felt a funny kind of warmth for her.

"Come on, then."

We held hands. I kicked aside some cereal boxes and we started down the steps. Almost at once—

The singing came. My cloak flapped gently in the breeze. The heather was in bloom, a bleakly beautiful landscape. I saw that Becky was now dressed in a white gown that rippled softly. We ran towards the tower, in slow motion it seemed, like a gushy scene in a romantic movie. Ahead the tower rose up. It had grown a little more. A flock of archaeopteryxes crossed the faces of the moons, and the tower called to me, called my name over and over. . . .

I saw where here another silver casement sprouted from its walls, there a vine of metal hugged the tower's trunk, new buds that had sprouted since the last visit. I knew then that it had been preying on Hermie's emotions. But when the tower sang I couldn't resist it. It was . . . like all the things my marriage had never given me.

Arthur! Arthur! Enter me, love me. . . .

We reached the foot of the tower. I walked into the irising door and Becky followed. Now we were in the drawing room, a sombre, baroque chamber of velvet hangings and wood-panelling and varnished oil paintings of busty Venuses and flutter-winged Adonises . . . the room, too, had grown, it seemed.

And then the voice—

Arthur! Why have you brought this woman? I will deal with her in due course. But now, come, come, come to me—

And I saw the silvery staircase that stretched up to merge into the sky-high roof, spiral upon spiral, and in my mind there burned the image of a golden Rapunzel, fair and soft and sensual, and I could hardly restrain myself from rushing up the staircase and throwing myself into her arms. . . .

Come, come, why do you resist me? Do I not love you as no one else can?

I had to go up the staircase. I had to confront the very soul of the alien. Heart thumping, I mounted the stairs, with Becky close behind me.

Then we were caught up in a wind, it seemed. The stairs had been illusions. Now we were drifting upward in the wake of some kind of force, some kind of tractor beam, the science fiction people would call it.

Now we were in another room, a womblike room with a single window, high up in the tower I supposed. The walls glowed, the air itself glowed. It was blinding. The walls were festooned with starlike sparklepoints, as though they had been papered with Christmas trees.

I knew what this room was; it was the room with the lighted window that I had glimpsed before, the room in the topmost turret of the tower.

And then out of the glitter stepped the most beautiful woman I had ever seen. Becky gasped. I knew then that the image had been shaped out of Becky's fantasies. Perhaps this was how she dreamed she should look, for me. . . .

She resembled Becky. But idealized. The red hair liberated from its hairpins and sprays and billowing behind her. The same white gown, the same features, but somehow purified. The same eyes, but on this woman they glowed like emerald cabochons.

It was a woman I could love.

And involuntarily I was stepping towards her, towards this creature I had come to destroy. She spoke to me.

Arthur. It was the same voice that had called me from the beginning, that had beckoned to me from beyond the dimensions. *You're here at last. Please stay with me, please don't leave me. I'll give you any illusion you want to sustain you. Just let me love you, here, forever. . . .*

"No!" I managed to whisper. "No, you've got to release me and

Hermie and all the other beings you've caught, that you've frozen into that terrible living death." But I hardly cared, I wanted to finish saying my piece and then just leap into her arms.

What are you saying, Arthur my dearest? Listen . . . I come from an ancient race that needs to love, that needs to give . . . we were millions once. We flew where we willed, from world to world, giving of ourselves and growing . . . then came hunger and desolation. I think I may be the last of my kind, and even I lay dormant for millennia upon millennia, too weak to fly away even, too weak to love. But now I am strong. Please, Arthur. I have to love! I have to give of myself, completely and utterly! It's my nature. I can't help it if I destroy the things I love—and yet who would not willingly choose death in exchange for a brief time of my love?

She stepped towards me. Her scent, so enticing, wafted toward me, and I was shaking with desire. So much for my brave defiant act to save the universe! I had lost. I walked towards her, arms outstretched, my body resounding with the beauty of her—

Becky interposed herself between us.

"No!" she cried out. "This isn't love at all! You don't know the meaning of love, you interstellar hussy, if you think this is it—"

But I am love! I am the perfect giving—

"Nonsense," Becky said. "You know nothing about love. If you'd read a single Caressa Byrd book . . . but no. Let me tell you something! My husband asked me for a divorce and I didn't utter one word of complaint. Because I knew he would be better off without me. I'm only a stupid woman with no repartee whom he can't show off in front of his friends at the University. But I really love him. For all your words and your beauty and your gorgeous illusions—you don't love him as much as I do! *Because you don't love him enough to give him up!*"

And then the dream-princess uttered a bloodcurdling scream that rang through the tower and chilled me to the core.

"Quick," said Becky, "while she's still confused—" She clasped my hand and we burst through the wall of lights which hadn't really been there at all, and the staircase opened up and we ran down it, stumbling and holding onto each other for dear life, while the scream echoed and re-echoed, a monster's death-scream, the stairs trembled as a tremor shook the tower—

We were running outside now. The scream went on behind us. It was no heather-strewn moor now, but a rocky desert, brown and craggy and burning, gridded with ragged sulphur clefts that smoked foul fumes. A dead world. Dead for millions of years perhaps—

Hermie was running alongside us. "You released me!" he shouted, panting. And when I glanced back I saw the unlikeliest crowd of marathoners you could possibly imagine: claw-waving, tentacle-shuffling, grunting, squeaking, hooting as they streamed out of the screaming tower.

"Thank Becky, not me," I said. We jogged on.

"Guess they'll rebuild their world now," Hermie said—

And then we stopped for a breath and turned around and saw—

Flames spurting from the tower's roots, silvery debris flying in a whirlwind around its base, the ground shaking, and then . . . the whole tower lifting itself into the sky, streaking up past the dancing moons, an eye-smarting daytime comet that left behind only an echo of a terrible scream, that melded with the sky and vanished. . . .

"Here," Hermie said. "Step through the interface."

We trooped into Hermie's Lego land.

For some reason Hermie didn't want his old house back—in fact, he never set foot in it again after pulling the plug on the transdimensional interface—and he took an apartment in West Philly, on Larchwood, I think.

A day or two after that, Becky got a letter in the mail. It was from Caressa Byrd.

Dear Mrs. Kurtz, [it ran]

Thank you so much for your twenty-one letters. I was deeply moved. Ah, we women, what frail creatures we are! You are a real woman and I know you will suffer anguish, yea the fires of hell itself, for the man you love. Why I myself, when I was captured by the evil Marquis von Ringdahl . . . but of course you've read that one, my dear. Continue to sacrifice yourself! One day he may come to understand. . . .

Your true friend,
Caressa Byrd

I was in town and I dropped in on Hermie. I wanted to show off the letter to him—it isn't every day that a real author writes to you.

After only a week, his apartment was a jungle. We sat on the floor and talked over a beer. It was like old times.

"I've learnt a lot," I said. "I thought that everything and everyone was my enemy before, and now I know that I haven't been exactly that perceptive myself. We're working things out, Rebecca and I. And the kids. Somehow it's not a war anymore."

It was true. I was happier. I didn't feel inadequate anymore. I had a wife who was willing to die for me. And we *had* saved the universe—although somehow it didn't really feel like that much of an achievement.

Anyhow, I pulled out the letter.

Hermie scrutinized it for a long time. Then he walked over to a big cardboard box and pulled out a pile of what looked like manuscripts of scientific papers.

Only they weren't. They all had titles like *Love's Raging Fury* and *Passion's Ravishing Flame* and *Desire's Diaphanous Dart*. . . .

"Caressa Byrd original manuscripts?" I gasped. "I've never seen *those* novels before . . . what *is* this?"

"Artie, my dear friend . . . I've a terrible confession to make. You see, when I was a starving high school student and needed money, the fastest way was to knock off one of these, and—"

"My God! You're Caressa Byrd!"

"I've never told a soul."

"And when you were away—"

"I had a backlog at my publishers. It only takes a week to write one of these things. . . ."

"No wonder the alien was convinced! She'd read Becky's mind and was feeding off yours . . . she must have believed that the love of gothic romances was genuine, human emotion."

"You mean it isn't?"

And Hermie smiled an enigmatic smile.

Hermie was the most frustrating person I ever knew. You simply couldn't get the better of him. He always had an extra ace or three up his sleeve. I couldn't do anything without him being there first.

Hell, even the alien tower affair had been on the rebound.

Dear George:

"His very successes have made him accept himself at too high an evaluation, perhaps."

A nice line from Isaac Asimov's "Nothing for Nothing" short story appearing in his Fall-Winter '79 *Science Fiction Anthology*.

A nice line—and a line I suspiciously thought might apply to the author himself. After all, accepting and publishing his own work in his own magazine!

Thankfully, I was wrong. A refreshing and original story. I might just as well accuse Dr. Asimov of being editor of the dozens of other national magazines I see his articles in so frequently. But then again, knowing Isaac . . .

. . . Say, *are* there such things as *editorial* pen names?

Jon Queijo
Sherborn MA

No, no, I don't accept and publish my own work. George accepts them—and sometimes rejects them.

—Isaac Asimov

Dear Mr. Scithers:

Just finished March 1980 issue and as usual enjoyed it very much. A particular lot of fun was Barry B. Longyear's "The Book of Baraboo."

HOWEVER . . . I think a magazine as perfect in all respects as yours owes it to the readers to correct authors' grammar. I refer to page 96, line 6 (in "The Book of Baraboo"), first word, which in my copy is "he." It should be "him," i.e. "Lieutenant Shimsiv reserved his synpathies for *him* who was most in need . . ."

This is becoming, sadly, a common mistake—one which I run across more and more frequently in other SF magazines. But in an *Asimov* publication? Really!

Yours,

David Tucker
Alexandria VA

Oops!

—Isaac Asimov

Gentlemen:

I must take issue with your reply to Eric Loranger in the Letters section of the March 1980 issue of *Isaac Asimov's Science Fiction Magazine.* His question was: does Mr. Pohl's position as a respected and renowned writer of science fiction qualify him "to use such offensive language within a dismal story to preach about allegedly declining mores and moral values in today's society?"

I have been watching the debate on Mr. Pohl's stories, as we are a family divided: our 15-year-old thought they were "neat" and the rest of us (considerably over 15) agreed that they are definitely dismal with no redeeming value equal to the space they are taking up in the magazine.

So far your poll on Pohl is running as we divided—you had an enthusiastic comment from a 14-year-old—and no good ones from the over-teen-agers.

Dear Doctor: If I have to ask myself "what was the author trying to say," the author has done a very poor job of saying it. The language may be an impediment—but a childish one—if you don't believe me, monitor a school bus ride or an elementary school playground.

When I got to the core, there was nothing there that couldn't have been there better. As Cyrano de Bergerac said "Think what you might have said!"

We have come to expect good quality, imagination and challenge in the works you accept and print. These did not measure up. Period.

Patricia W. Parsons (Mrs. D.S.)
Towanda PA

The thing to do, seriously, is to talk to your teen-ager and find out what *it was that appealed to him. Cyrano might say, "Think what you might have learned!"*

—Isaac Asimov

Dear Dr. Asimov,

Thank you! Thank you! Thank you! Your magazine is terrific!! The stories and the artwork are both great and I love your sense of humor (sic) or is that (sick?!) ha ha! I just began my subscription with your March issue and bravely jumped in headfirst, naively unprepared for what you had in store for me. I fell (heavily—ouch!) for "Missing the Points" by Chuck McMichael and then, much to my chagrin, fell again for "Relatively Speaking" by Lee Weinstein and Darrell Schweitzer. (The title should have given it away if only I hadn't been so innocently trusting—I'll know better next time.)

I have only one complaint—I voraciously read through the magazine in a few hours and then have to wait a whole month till the next issue comes out! But I guess that I can't blame you if all the stories are so good that I can't bear to put it down until I've read them all. (Or maybe I *can* blame you!) Please keep on doin' what you're doin', I love ya!!

My husband and I both dabble with words (wouldn't you know it?!) so please send us a copy of your Editorial Requirements and a Format sheet. [*Done!*] And once again, many thanks to you, the editors and staff and the fine writers and artists for making and keeping this publication so enjoyable month after happy month! I'm looking forward to May!!

Thanks again *again,*

Susan Tilghman Reilly
714 Vermont Ave.
Portsmouth VA 23707

Savor! Savor! Read a story a day!

—Isaac Asimov

Dear Sir;

When I first saw your magazine (March 1980) I was frankly rather shocked and perhaps a little disappointed. The first thought that crossed my mind was, "Well, they'll do just about anything to sell a magazine now, won't they? They'll even put Dr. Asimov's name on it just so they can push a few more copies out on an unsuspecting public!" However, I decided to read the magazine before passing final judgment. Reading it was probably one of the smartest things I've ever done. Dr. Asimov seems to have the King's touch, and everything that comes near him turns to gold. If this magazine is ever recognised as the piece of excellent craftsmanship that it is, it is sure to be a hit.

Sincerely

Thomas E. Sisk, Jr
Ft Bragg NC

Well, I picked George and George picked Shawna and that's where the Midas touch comes in.

—Isaac Asimov

Dear Isaac, George, Shawna, & Joel:

I'll keep this short, since you've heard much of it so often already. Love your magazine, all sections, can't pick a favourite. The stories are always outstanding in quality, delights to the mind. However, I am in the lonely minority that can't stand the Momus stories. They bore me to tears. As a fellow writer, however, I wish Barry no ill. Obviously, he's doing something right for a lot of people out there. I guess Momus just isn't my taste, and you can't please everyone. He probably wouldn't like my stories either. I do wish he'd start his own magazine, and let *IAsfm* get on with other stuff.

I thought you'd like to know I've spotted a disturbing trend in SF. I am a regular reader of eight of the top magazines. In recent months, I have often found myself at the punch line of a bad pun, and had to close the magazine and read the cover again, to be sure I wasn't reading *IAsfm* by mistake. I knew the situation had reached epidemic proportions when I found a terrible pun in the staid pages of *Analog*.

Isaac, what are you doing to us all? Is there no stopping the plague? Is there no cure? What have we done to deserve this punishment?

(Don't pay any attention to me, I love it. I'm a masochist at heart.)

Affectionately,

Shari
Santa Clara CA

Of course, you love it. Believe me, I have an instinctive knowledge of what stirs maidenly hearts.

—Isaac Asimov

Dear Sir:

When I received your note and literature I stood by the mailbox in a gale force wind and read it all. Once inside the house, I sat down and reread it. Of course, it makes sense! So *much* sense that I got the hiccups, because I had just sent six more stories out at the time! Alas, I thought about tampering with the U.S. Mail, but thought better of it . . . and decided to take your advice, and the rejections, with humility.

I have been busy reading all that I can . . . science periodicals, all of Isaac Asimov's books from the shelves of our small town's library, and, of course, Isaac Asimov's SF magazines.

I have written another story. I can almost see you wince! But I

have *tried* to incorporate into this story the knowledge I have gained from the best that I have read and from the worst that I have written.

Thank you for your help,

Sharon Clemons Muncatchy
Brooklyn MI

You're working hard and that's the whole battle. Win or lose, it gives your life meaning.

—Isaac Asimov

Dear Sir,

I've just read the March 1980 issue of your magazine and was finding it interesting. Both "Psychostars" and "Missing The Points" were interesting stories and I felt that the whole issue would be like that. Then I came to "Darkmorning" and realized that it wouldn't be. The entire story left me with a cold feeling. None of the characters were anyone I could feel anything for, and the whole story seemed vague and pointless. Even the implied message fails, since the way of life of the people makes it clear that they cannot follow what they believe. If their belief is that humans must change, then why have they allowed themselves to live in a stagnant culture? It seems that their only purpose is to wait for ships that will probably never come and that makes for a poor life, a stagnant culture that will probably remain as it is until there are no people left. Altogether, the story seems to contain three of the items that you often reject stories for, according to your writer's guidelines. The story does have enough wonders in it; but little more than that, since the characters fail to change. They failed to learn and are still stuck in their pattern of waiting for something to happen, not trying to do anything on their own.

Then there was content. The story seemed pointless and the idea thin, since their very way of life makes it seem that they had let themselves become stagnant. That makes for a poor story, one that failed to convince. I went through the whole story waiting for something to happen and was still waiting when I came to the end. I felt nothing for the people in it and was wishing they would all go into winter sleep and die during it so that we would not have to endure reading about people no one can care about. It came out that I cared more about the new deity in "Psychostars" that anyone in "Darkmorning." I can only hope that other stories in your future issues

will be better and not leave me as cold and disappointed as this one did.

Live Long and Prosper

Bruce Melton

As a writer, I bleed for a fellow-writer having to read a criticism like this; but then it gives a chance for someone with a contrary opinion to rise to the defense.

—Isaac Asimov

Dear Dr. Asimov, Mr. Scithers, and Everyone Else Involved,

Thank you for an indescribable publication! I recently subscribed, and I can't really say how much better the whole day becomes when I find a copy of your magazine in my mailbox. The first thing I turn to is the "Letters" column. The magazine seems much more personal when I see the letters and the replies from all you editors. I enjoy the Good Doctor's witty remarks. From there, I go to the editorial and proceed to read the magazine cover to cover. I haven't skipped a story yet. I'm especially happy when I find a story by Mr. Longyear, or a good story by a new, never-before-published author. It's nice to know that there's hope for those of us who are as yet unpublished.

I wish I could write more words of praise for your excellent magazine, but my April issue came today, and I can't wait any longer to finish reading it.

Yours Sincerely,

Laura A. Wideburg
Urbana IL

Of course, there's hope. The cardinal rule to remember is that every published author—without exception—was once an unpublished author.

—Isaac Asimov

Dear Mr. Scithers:

The last rejection slip you sent me is the kindest one I have ever seen because you *told* me what I did wrong.

Thank you,

Glenn Jacobs

I wish I had George's talent in this direction. I never know what's wrong.

—Isaac Asimov

It isn't exactly knowing what's wrong; it's writing something that makes the story's author realize how he can make it better—either by fixing the story at hand or by doing better next time. Glenn's realization of what's wrong is quite as important as is our putting down what we **think** *is the matter with the story.*

—George H. Scithers

Dear Dr. Asimov:

I am finally writing a letter to indicate my appreciation for your magazine. I am now a subscriber and plan to remain that way for a while. Finding your magazine in my mailbox makes the bills hurt a little less.

I am fascinated by the letters complaining about this, that, and the other thing you put in the magazine. Given my choice your magazine would consist of alternating Ferdinand Feghoots and problems. However, there's something for everyone and I like it that way.

My wife and I are both frustrated writers and would like to submit an attempt of ours, so are enclosing a SASE for your format requirements.

An idea I am more than willing to give you in hopes that you might decide to use it involves old *Amazing*s, *Weird Tales* and such. I for one would really like to see someone come up with a system whereby we could subscribe to reprints of some of these old magazines. For example open with the April 1940 issue of some magazine and run for one year to the April 1941 issue and having the issues arrive each month as though they were coming out for the first time. For those of us who like the old magazines, but cannot afford a lot of them this would be great! No more "continued next issue" and the next issue is nowhere in your collection. Editorial duties would be minimal. Printing rights should be cheap enough. The magazine can be changed enough to make it obviously not original, but still retain the original cover, and the articles as they ran. An advertising supplement could help defray costs, and would not be too intrusive.

As a fan of yours for many years, I'd like to thank you for bringing out this magazine for those of us who like good SF and bad puns.

(If a pun is bad, is it good, or if it's good, does that make it bad?)

Thank you,

Robert A. Osman
Albuquerque NM

But think! How would you and your wife manage to sell stories to new magazines if they all went out of business because everyone was reading the old magazines?

—Isaac Asimov

Dear Sirs:

Just a quick note to tell you how much I enjoy your magazine. (I'm late for work, so I don't have time to correct my mistakes.) Though I have read your magazine on occasion since its inception, I just recently became a subscriber. The high quality of this magazine, month after month, with new young writers (and maybe new old writers) brings much pleasure. Your April issue is a good example. With the exception of the James Gunn piece, which I found like reading a book report, the stories were all quite pleasing and well done. (I am, you understand, excluding from this the awful joke, "Relatively Speaking.") Keep up the good work.

Again I apologize for the mistakes, I am now 15 minutes late! Which brings me to my real reason for writing. Please send me your Editorial Requirements and Format sheets. Enclosed is the required stamped envelope.

Thank you.

Steven Armbrust
5528 S.W. Shattuck Rd.
Portland OR 97221

You're right. The James Gunn piece was indeed a book report. But it was about such an interesting *book.*

—Isaac Asimov

Dear Mr. Scithers:

Although I realize that Mr. Schweitzer's list of Science Fiction clubs in the US was not intended to be an exhaustive list, I thought that you might be interested in printing some information about the other clubs in the New York City—Northern New Jersey area:

The Bergen County Science Fiction Society meets on the third

Saturday of each month at 7:30 P.M. in the Borough Hall ofEmerson, NJ. The group schedules guest speakers at most meetings and has several fanzines going.

The Columbia University Science Fiction Society meets at Ferris Booth Hall in Room 317 each Tuesday at 6:00 P.M. The group runs an annual convention, Apricon, and is assembling an impressive library.

The Eastern Science Fiction Association, one of the oldest such groups in the nation, meets on the first Sunday of most months in the Public Library in Wayne, NJ at 3:00 P.M. It's a small discussion group of long-time fans which runs no club projects.

The Lunarians, the New York Science Fiction Society, are the best-known group in the area and meet at various member's homes. They run the Lunacon, the area's oldest (now in its 23rd year) con, and have many members involved in various fan activities, although the only official club activity is Lunacon.

The NYU group was mentioned in the article, so it is deliberately ommitted here.

All of these groups draw their membership from both NY and NJ. As Membership Director of BCSFS, I can put people in touch with any of these groups if they write to me at Box 65, Paramus, NJ 07652, C/O The Bergen County Science Fiction Society. Please include your return address and phone. Our group is always interested in new members.

Sincerely,

Philip J. De Parto

Ah, how different from the medieval times of my youth!

—Isaac Asimov

NEXT ISSUE

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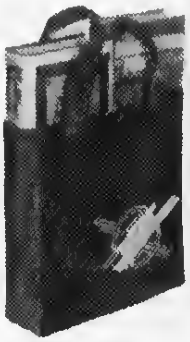

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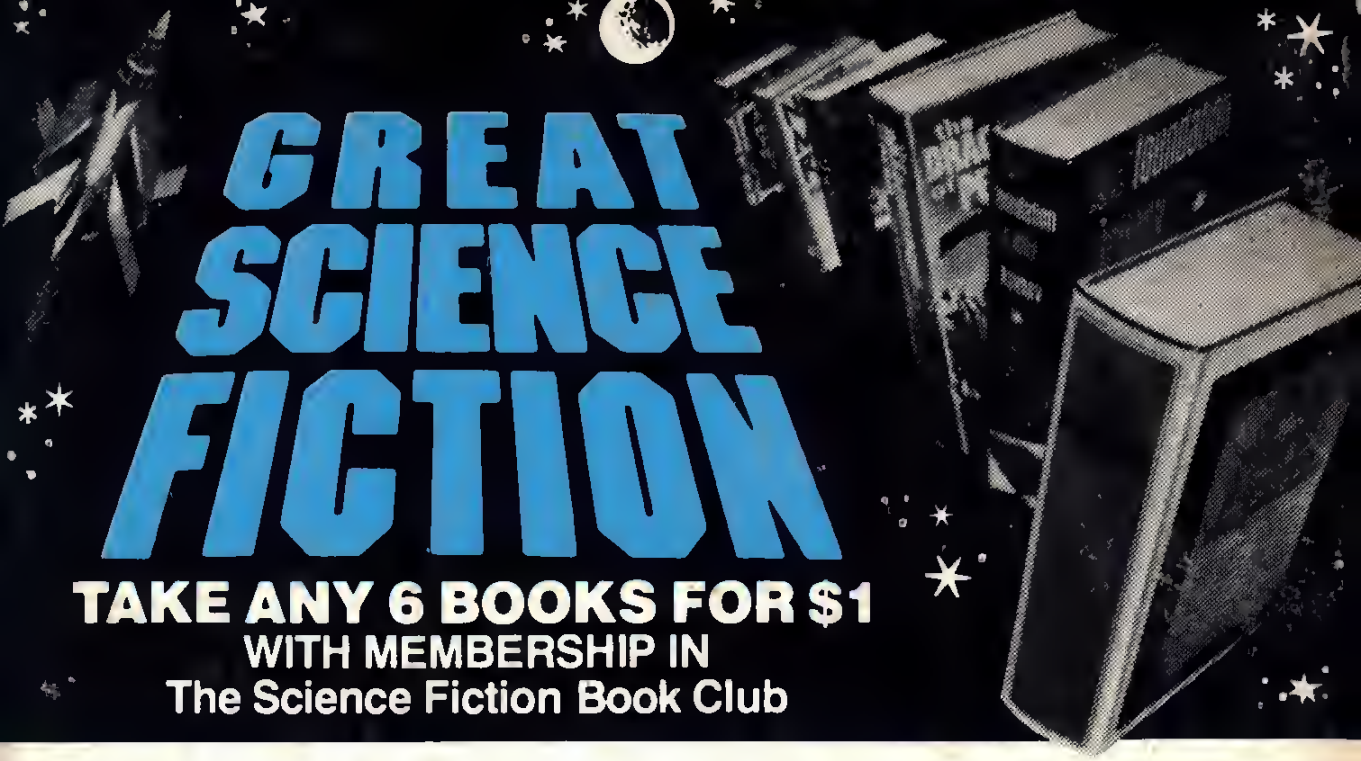

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